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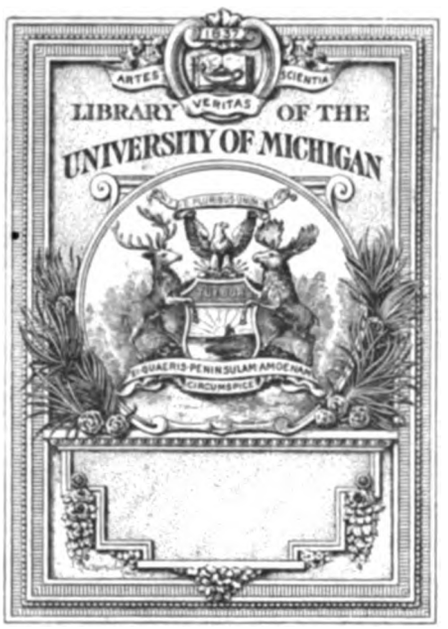

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PUBLICATIONS

OF THE

UNITED STATES NAVAL OBSERVATORY.

SECOND SERIES.

VOLUME VI.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1911.

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SUPERINTENDENT.

Commodore T. E. De Witt Veeder, U. S. N. (Retired).

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William S. Eichelberger	*Professor of Mathematics, U. S. N.*
Frank B. Littell	*Professor of Mathematics, U. S. N.*
Asaph Hall, jr.	*Professor of Mathematics, U. S. N.*
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Forrest F. Harbour	*Miscellaneous Computer.*
Romeyn A. Spare	*Miscellaneous Computer.*

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PREFACE.

The work of preparing for publication the Equatorial Observations, 1893–1907, was begun in 1904. All the observations made previous to this time (1904), and which were reduced, were thoroughly checked; those observations which were not reduced were both reduced and checked. In addition, improved star positions were in many cases substituted for those used in the original reduction of asteroid and comet observations.

This work was principally done by Assistant Astronomer H. L. RICE, Assistant Astronomer J. C. HAMMOND, and Assistant MATT FREDERICKSON of the Equatorial Division under the direction of the various heads of this division. The work was pushed forward as rapidly as possible without seriously interrupting current observations.

The preparation of Appendices I and III for publication was done by the several authors. Appendix II consists of reports of the observations of the Transit of Mercury of November 10, 1894, which were sent to this Observatory in response to a request contained in a circular a reprint of which may be found on page C 7.

After the preparation of the printer's copy was finished the volume was referred to the Executive Committee of the Council for approval. The proof reading was performed by Assistant ELEANOR A. LAMSON under the supervision of Prof. W. S. EICHELBERGER, U. S. N. All proofs beyond the first have been read only to insure insertion of the corrections desired, except that in the plate proof the final results have been read entire.

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ERRATA.

VOLUME FOR 1878.

PAGE 142. In table *Jupiter*, first line, twelfth column: For $+2''.6$ read $+0''.8$.

VOLUME II, SECOND SERIES.

PAGE XIV. Omit the table *Observations of anonymous stars* and substitute:

Star Zone 1, No. 29, an error of 1^m in α having been found before the preparation of the Washington Astronomische Gesellschaft Catalogue, was identified as B. D. $-16°756$: Star Zone 12, No. 54, was identified as the companion of B. D. $-14°1307$. In supervising the printing of the Catalogue Dr. RISTENPART suggested changes in the record by means of which nine of the stars were identified as having names. The remaining five stars are listed as anonymous, as follows:

Observed Mag.	α 1900.0	δ 1900.0	No.	Zone.
	h m s	° ′ ″		
9.0	2 54 32.64	−17 8 15.00	66	81
..	7 12 13.50	14 37 29.94	102	9
..	7 35 0.03	16 25 7.41	162	158
9.3	15 32 7.23	15 19 55.53	80	53
9.4	20 31 43.42	−17 12 1.21	18	71

Star Zone 81, No. 66, Star Zone 53, No. 80, and Star Zone 71, No 18, were looked for in the heavens, but were not found; hence they have been discarded from the Catalogue. Star Zone 9, No. 102, and Star Zone 158, No. 162, were found and are entered as anonymous in the Catalogue.

PAGE 3, No. 29, ninth column: For $57^m\ 45^s.66$ read $56^m\ 45^s.66$
twelfth column: For $3^h\ 57^m\ 44^s.82$ read $3^h\ 56^m\ 44^s.83$
thirteenth column: For $-16°\ 20'\ 52''.48$ read $-16°\ 20'\ 51''.99$
fourteenth column: For . . . . . read $-16°756$

PAGE 15, No. 102, twelfth column: For $7^h\ 12^m\ 13^s.49$ read $7^h\ 12^m\ 13^s.50$
thirteenth column: For $-14°\ 40'\ 42''.44$ read $-14°\ 37'\ 29''.94$

PAGE 19, No. 53, fourteenth column: For $-14°1307$ read $-14°1307^1$
No. 54, fourteenth column: For . . . . . read $-14°1307^2$

PAGE 23, No. 60, ninth column: For $14^m\ 47^s.89$ read $14^m\ 47^s.92$
tenth column: For $53°\ 52'\ 5''.0$ read $53°\ 42'\ 5''.0$
twelfth column: For $6^h\ 15^m\ 7^s.25$ read $6^h\ 15^m\ 7^s.30$
thirteenth column: For $-15°\ 3'\ 55''.09$ read $-14°\ 53'\ 54''.62$
fourteenth column: For . . . . . read $-14°1404$

PAGE 40, No. 82, tenth column: For $54°\ 58'\ 5''.0$ read $54°\ 48'\ 5''.0$
twelfth column: For $7^h\ 16^m\ 45^s.00$ read $7^h\ 16^m\ 45^s.02$
thirteenth column: For $-16°\ 7'\ 31''.64$ read $-15°\ 57'\ 31''.14$
fourteenth column: For . . . . . read $-15°1777$

PAGE 44, No. 50, ninth column: For $26^m\ 6^s.96$ read $26^m\ 6^s.97$
tenth column: For $53°\ 34'\ 4''.0$ read $53°\ 54'\ 4''.0$
twelfth column: For $7^h\ 26^m\ 37^s.40$ read $7^h\ 26^m\ 37^s.30$
thirteenth column: For $-14°\ 45'\ 49''.41$ read $-15°\ 5'\ 50''.30$
fourteenth column: For . . . . . read $-15°1873$

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PAGE 130, No. 44, ninth column: For $20^m\ 8^s.61$ read $20^m\ 8^s.58$
tenth column: For 55° 40′ 10″.0 read 55° 32′ 10″.0
twelfth column: For $18^h\ 20^m\ 47^s.71$ read $18^h\ 20^m\ 47^s.67$
thirteenth column: For −16° 50′ 13″.86 read −16° 42′ 13″.47
fourteenth column: For ..... read −16°4875

PAGE 165, No. 2, ninth column: For $54^m\ 53^s.09$ read $54^m\ 53^s.12$
tenth column: For 56° 42′ 10″.0 read 56° 52′ 10″.0
twelfth column: For $20^h\ 54^m\ 24^s.76$ read $20^h\ 54^m\ 24^s.80$
thirteenth column: For −17° 50′ 48″.00 read −18° 0′ 48″.50
fourteenth column: For . .... read −18°5827

PAGE 213, No. 56, tenth column: For 56° 52′ 10″.0 read 56° 32′ 10″.0
twelfth column: For $7^h\ 5^m\ 31^s.91$ read $7^h\ 5^m\ 31^s.95$
thirteenth column: For −18° 3′ 14″.00 read −17° 43′ 12″.66
fourteenth column: For ..... read −17°1811

PAGE 387, No. 3, ninth column: For $48^m\ 19^s.92$ read $48^m\ 20^s.05$
tenth column: For 305° 34′ 10″.0 read 304° 34′ 10″.0
twelfth column: For $1^h\ 47^m\ 36^s.92$ read $1^h\ 47^m\ 37^s.03$
thirteenth column: For −15° 26′ 34″.02 read −16° 26′ 37″.00
fourteenth column: For ..... read −16°323

PAGE 405, No. 27, ninth column: For $55^m\ 21^s.07$ read $55^m\ 21^s.01$
tenth column: For 304° 6′ 10″.0 read 304° 26′ 10″.0
eleventh column: For I read I A
twelfth column: For $4^h\ 55^m\ 29^s.69$ read $4^h\ 55^m\ 29^s.68$
thirteenth column: For −16° 54′ 59″.91 read −16° 31′ 43″.23
fourteenth column: For ..... read −16°1017

PAGE 513, No. 11, eighth column: For (c) read a
ninth column: For $28^m\ 46^s.96$ read $29^m\ 16^s.83$
eleventh column: For (III) read I
twelfth column: For $8^h\ 28^m\ 16^s.75$ read $8^h\ 28^m\ 46^s.62$
thirteenth column: For −16° 39′ 21″.26 read −16° 39′ 19″.51
fourteenth column: For ..... read −16°2504

VOLUME III, SECOND SERIES.

For pages A 69, A 70, A 71, A 72 read pages B 40, B 41, B 42, B 43, Appendix I, Volume VI.

PAGE D4, No. 6, second column: For Anonymous read B. D. +21°1067
fourth column: For $53^m\ 38^s\ 40$ read $53^m\ 38^s.36$
fifth column: For $0^s\ 73$ read $-0^s.76$
seventh column: For $5^h\ 52^m\ 51^s\ 43$ read $5^h\ 52^m\ 51^s.36$
eighth column: For $2^s\ 51$ read $-2^s\ 52$
ninth column: For 339° 19′ 30″ 92 read 338° 19′ 30″.92
eleventh column: For 19″ 2 read 18″.1
twelfth column: For + 20° 39′ 15″ 7 read + 21° 39′ 16″.9
fourteenth column: For + 2″ 2 read + 1″.9

PAGE D6, No. 14, second column: For Anonymous read B. D. + 21°1023
fifth column: For $0^s\ 94$ read $0^s\ 80$
seventh column: For $5^h\ 47^m\ 13^s\ 84$ read $5^h\ 47^m\ 13^s\ 89$
eighth column: For $2^s\ 13$ read $2^s\ 11$
ninth column: For 339° 56′ 36″ 40 read 338° 56′ 36″.40
eleventh column: For 18″ 6 read 19″ 7
twelfth column: For + 21° 2′ 14″ 2 read + 21° 2′ 12″ 1
fourteenth column: For + 1″ 8 read + 1″ 9

PAGE D11, No. 8, second column: For Anonymous read B. D. + 20°1047
fifth column: For $0^s\ 4$ read $0^s\ 27$
seventh column: For $8^h\ 7^m\ 40^s\ 01$ read $8^h\ 7^m\ 40^s\ 08$
eighth column: For $2^s\ 6$ read $2^s\ 7$
ninth column: For 344° 56′ 18″ 48 read 344° 56′ 18″ 48
eleventh column: For 18″ 0 read 18″ 9
twelfth column: For + 28° 2′ 19″ 8 read 28° 2′ 20″ 6
thirteenth column: For 18″ 1 read 19″ 2
fourteenth column: For 1″ 1 read 1″ 8

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PAGE D 95, first column, fifth set: For Anonymous read B. D.+21°1023
For $5^h\ 47^m\ 11^s.19$ read $5^h\ 47^m\ 11^s.26$
For +22° 2′ 14″.7 read +21° 2′ 14″.0

second column, ninth set: For Anonymous read B. D+21°1067
For $5^h\ 52^m\ 48^s.92$ read $5^h\ 52^m\ 48^s.84$
For +20° 39′ 17″.9 read +21° 39′ 18″.8

PAGE D 97, first column, third set: For Anonymous read B. D.+26°1747
For $8^h\ 7^m\ 37^s.25$ read $8^h\ 7^m\ 37^s.21$
For +25° 2′ 27″.6, 26″.2 read +26° 2′ 28″.4, 27″.0

PAGE D 103, No. 19, first column: For Anonymous read B. D.+21°1023
second column: For $5^h\ 47^m\ 11^s.190$ read $5^h\ 47^m\ 11^s.260$
fourth column: For +22° 2′ 14″.70 read +21° 2′ 14″.00

No. 22, first column: For Anonymous read B. D.+21°1067
second column: For $5^h\ 52^m\ 48^s.920$ read $5^h\ 52^m\ 48^s.840$
fourth column: For +20° 39′ 17″.90 read +21° 39′ 18″.80

No. 38, first column: For Anonymous read B. D.+26°1747
second column: For $8^h\ 7^m\ 37^s.250$ read $8^h\ 7^m\ 37^s.210$
fourth column: For +25° 2′ 27″.60 read +26° 2′ 28″.40
sixth column: For 26″.20 read 27″.00
seventh column: For 26″.90 read 27″.70

VOLUME IV, PARTS I–III, SECOND SERIES.

PAGE B 126, line 34, twelfth column: For +2″.6 read +0″.8

VOLUME IV, APPENDIX I, SECOND SERIES.

PAGE D 31, in table *Comparison of Sidereal Chronometer, Negus No. 1295, with Noon Signal from Washington, D. C.*
first line, fourth column: For $+0^s.1$ read $-0^s.1$
fifth column: For $2^h\ 15^m\ 27^s.4$ read $2^h\ 15^m\ 27^s.2$
seventh column: For $+28^m\ 42^s.3$ read $+28^m\ 42^s.5$
between first and second line, eighth column: For $+1^s.65$ read $+1^s.55$

PAGE D 32, in table *Longitude of Eclipse Station, Griffin, Ga.*
first line, second column: For $0^h\ 28^m\ 43^s.1$ read $0^h\ 28^m\ 43^s.3$
third line, second column: For $+0^h\ 28^m\ 53^s.2$ read $+0^h\ 28^m\ 53^s.4$
below table, second line: For $0^h\ 28^m\ 54^s.0$ read $0^h\ 28^m\ 54^s.1$
third line: For $5^h\ 37^m\ 9^s.8$ read $5^h\ 37^m\ 9^s.9$

VOLUME IV, APPENDIX III, SECOND SERIES.

PAGE F 12, line 11: For $\tau_m=\tau_m^E+\tau_m^W$ read $\tau_m=\frac{1}{2}(\tau_m^E+\tau_m^W)$

line 12: For $\tau_w=\tau_w^E+\tau_w^W$ read $\tau_w=\frac{1}{2}(\tau_w^E+\tau_w^W)$

line 13: For $\tau_e=\tau_e^E+\tau_e^W$ read $\tau_e=\frac{1}{2}(\tau_e^E+\tau_e^W)$

line 15: For $\theta_w=\theta_w^E+\theta_w^W$ read $\theta_w=\frac{1}{2}(\theta_w^E+\theta_w^W)$

line 16: For $\theta_e=\theta_e^E+\theta_e^W$ read $\theta_e=\frac{1}{2}(\theta_e^E+\theta_e^W)$

PAGE F 13, line 11: For meridian read six-hour circle

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EQUATORIAL OBSERVATIONS.

1893—1907.

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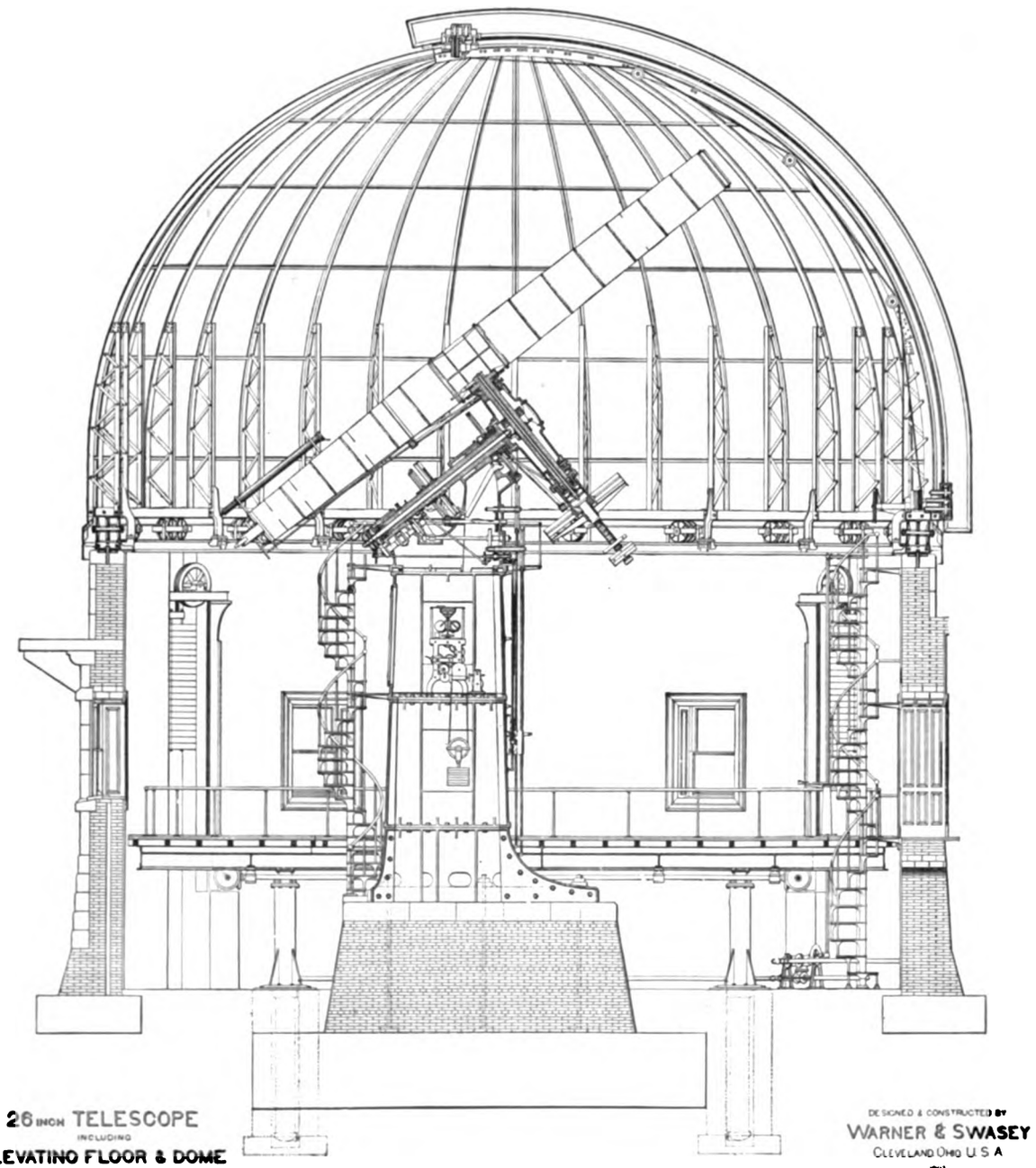

SECTION OF THE 26-INCH EQUATORIAL AND DOME.

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INTRODUCTION.

By J. C. HAMMOND.

The present volume contains the observations made with the equatorials of this observatory from the time of its removal to the present site in 1893 to the beginning of the year 1908, with the exception of the observations of Eros for parallax in 1900–1901. The latter have already been published in the Publications of the United States Naval Observatory, Second Series, Volume III, Part I. The instruments in use have been the two equatorials of 26-inches and 12-inches aperture, respectively. The latter instrument had a 9.6-inch object-glass until December 19, 1895, after which date the 12-inch object-glass has been used. These instruments have been under the supervision of the following astronomers:

26-INCH EQUATORIAL.

Prof. of Math. S. J. BROWN, U. S. N., 1893–December 15, 1899.
Prof. of Math. T. J. J. SEE, U. S. N., December 18, 1899–September 20, 1902.
Prof. of Math. A. N. SKINNER, U. S. N., September 20, 1902–July 10, 1907.
Prof. of Math. W. S. EICHELBERGER, U. S. N., July 10, 1907–December 31, 1907.

12-INCH EQUATORIAL.

Prof. of Math. EDGAR FRISBY, U. S. N., 1893–May 22, 1899.
Prof. of Math. T. J. J. SEE, U. S. N., July 16, 1899–December 17, 1899.
Prof. of Math. S. J. BROWN, U. S. N., December 17, 1899–March 25, 1901.
Assistant Astronomer, THEO I. KING, March 30, 1901–November 15, 1903.
Prof. of Math. A. N. SKINNER, U. S. N., November 15, 1903–July 10, 1907.
Prof. of Math. W. S. EICHELBERGER, U. S. N., July 10, 1907–December 31, 1907.

The general plan of work has been to observe, (1) the satellites and the diameters of planets, (2) some of the interesting and difficult double stars, (3) the minor planets and comets, and (4) the occultations of stars by the Moon. The 26-inch has been devoted exclusively to observing the fainter and more difficult objects. Continuity in the observations of the satellites of Saturn, Uranus, and Neptune has been considered especially important. The different classes of observations are printed separately and a summary of each class is given in this introduction.

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DESCRIPTION OF THE INSTRUMENTS.

The 26-inch equatorial was dismounted at the old Naval Observatory in December, 1892, and a number of its parts, including the two finders and the two microscopes for reading the declination circle, were sent to The WARNER and SWASEY Company, of Cleveland, Ohio, to be fitted to the new mounting which they were constructing for the new Naval Observatory. This new mounting was completed and the 26-inch objective with its cell attached in June, 1893. Some time was spent in making the necessary adjustments and in arranging the illumination, hence the telescope was not ready for regular observing until December, 1893.

The 9.6-inch equatorial was dismounted at the old observatory in October, 1892, while a new 12-inch equatorial mounting was in course of construction at the new observatory by GEORGE N. SAEGMÜLLER, formerly of Washington, D. C. The new mounting was completed in November, 1892, and the old 9.6-inch objective was temporarily adapted for use with it. This objective continued to be used until December 19, 1895, when it was replaced by a new 12-inch objective made by ALVAN CLARK and Sons. The instrument was ready for regular observing in October, 1893.

The general features of these instruments, which will be described somewhat in detail, can be seen from the accompanying plates.

I. THE 26-INCH EQUATORIAL.

The objective.—The objective was made by ALVAN CLARK and Sons in 1873. A complete investigation of it by Prof. E. S. HOLDEN, U. S. N., may be found in the Washington Astronomical Observations for 1877, Volume XXIV, Appendix I. The following data are extracted from this appendix:

Clear aperture	26. 00 inches.
Principal focal length	389. 66 inches (at 32° F.)
Thickness of crown glass at center	1. 884 inches.
Thickness of flint glass at center	0. 958 inches.
Thickness of objective in cell at center	2. 871 inches.
Weight of crown glass	70 pounds.
Weight of flint glass	110 pounds.

The two lenses are separated by three pieces of tin-foil at their edges. The magnitude of the faintest star, on ARGELANDER'S scale extended, that can be seen with this objective is 16.3, and its separating power is, according to the formula of DAWES, 0.″18.

The objective has been twice removed from its cell and cleaned, once on December 7, 1894, and again on November 12, 1897.

The column.—The column is of iron cast in three sections, ribbed on the inside to secure stiffness and accurately fitted and bolted together. The lower section is 3 feet 2 inches high and has a base measuring 12 feet on the north and south line by 10 feet on the east and west. It is bolted rigidly to the capstone of the masonry pier. The middle section of the column is 6 feet 10 inches high. At the base it measures 6 feet 6 inches on the north and south line by 3 feet 8½ inches on the east and west. This section has two doors, one on the east side and another on the west, for access to the chamber in the lower part of the column. The upper section

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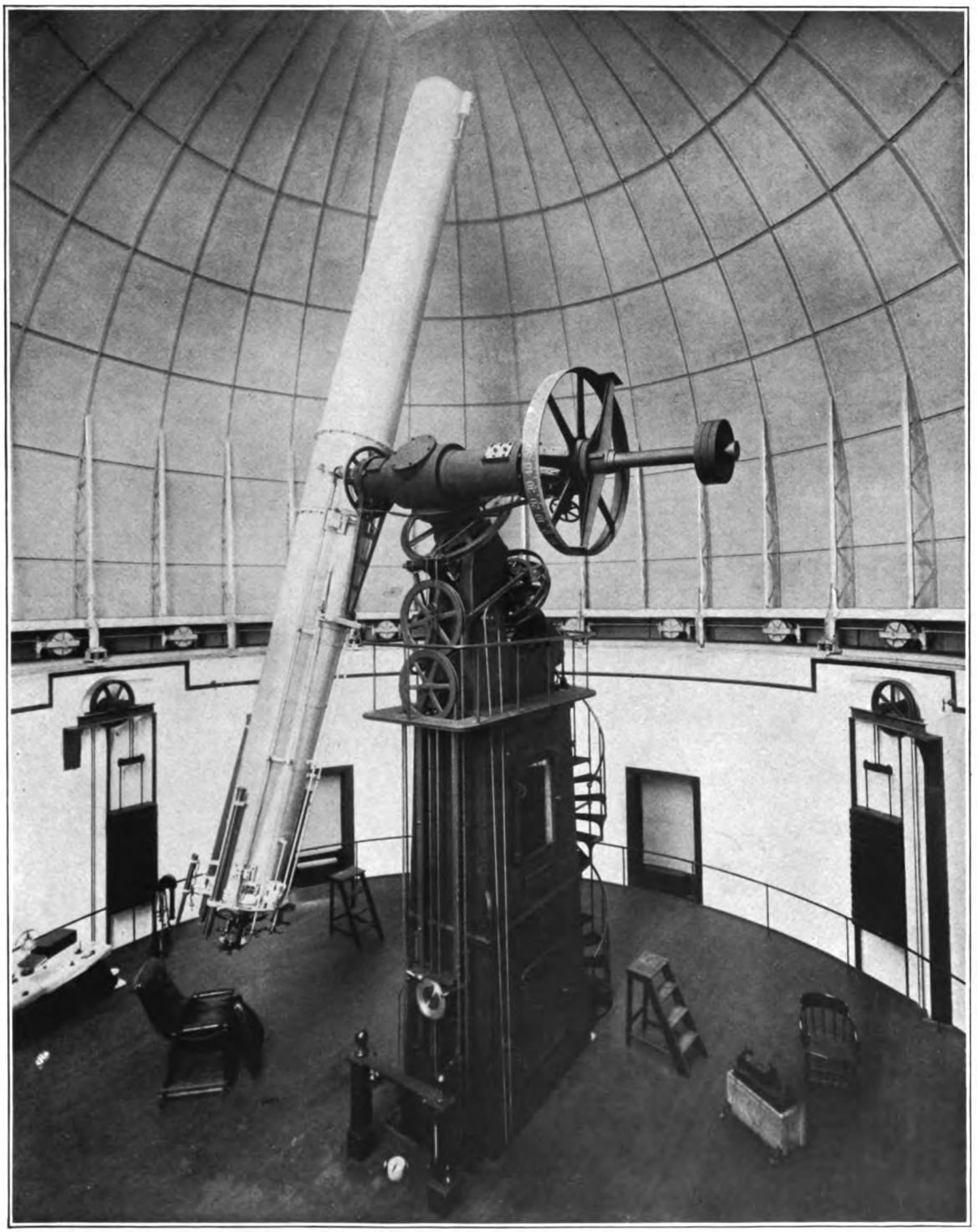

THE 26-INCH EQUATORIAL—SHOWING NORTH SIDE OF COLUMN WITH SETTING DIAL AND MICROSCOPES FOR READING THE HOUR CIRCLE.

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is 6 feet 10 inches in height and measures at the base 6 feet 1¾ inches on the north and south line by 3 feet 4¼ inches on the east and west. The top of this section, which is also the top of the column, is 5 feet 9½ inches on the north and south line by 3 feet on the east and west. This section contains two glass doors, one on the east side and one on the west, for access to the driving clock which is situated within. The total height of the column above the capstone is 16 feet 10 inches.

The pier.—The pier which supports the column is of solid concrete, 18 feet by 21 feet at the base, and 16 feet in height. It is sunk 12 feet below the basement into the earth. The pier is 172 feet directly south of the center of the clock room, which determines the latitude and longitude of this observatory.

The equatorial head.—This consists of a single casting of great solidity to carry the polar axis and its attachments. It is bolted to the top of the column and provided with means for adjustment in altitude and azimuth. The adjustment for altitude became exhausted, and a steel plate 0.125 inch thick was inserted under the northern adjusting wedge, so as to bring the adjusting screws back to the middle of their runs. This change was made by The WARNER and SWASEY Company in June, 1896.

Around the head is placed an iron balcony with a brass railing, giving easy access to the working parts of the instrument. This balcony is reached by an iron spiral staircase on the south side of the column, with a landing at the top of the central section, from which admittance can be had to the driving clock by means of a door through the south side of the upper section.

The axes.—The polar and declination axes are of hard, forged steel. The former is 8 feet 6 inches long and has a diameter of 9 inches at the upper end, tapering to 8 inches at the lower end. It is bored out 2½ inches through the center.

The declination axis is approximately 7 feet 6 inches in length with a diameter of 8 inches at the upper end, tapering to 7 inches at the tube. It is bored out in a similar manner as the polar axis. The friction of both axes in their bearings, as well as their end thrusts, are relieved by antifriction mechanisms.

The tube.—The tube is of hard rolled sheet steel, except the central section, which is of cast steel for attachment to the head of the declination axis. It is made up of sections, fourteen in all, including the central section. The three sections on each side of the central section are 0.134 inch thick. The next two sections on each side are 0.094 inch thick. The outer sections, one at the eye-end and two at the object-glass end, are 0.072 inch thick. These sections are solidly riveted together and the tube tapers each way from the center. The diameter at the center is approximately 2 feet 8 inches, at the eye-end 2 feet, and at the object-glass end 2 feet 5 inches. The tube is approximately 372 inches long.

The circles.—The instrument is supplied with finely divided silver circles both in hour angle and declination. The circle for reading the hour angle is 2 feet 4 inches in diameter and is divided to 20 seconds of time. It is read by verniers to 1 second of time.

The declination circle is also 2 feet 4 inches in diameter, and is divided to 5 minutes of arc. It is read to 10 seconds of arc by means of verniers.

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For reading the hour circle there are two telescopes on the north side of the column, fixed to a slide which moves up and down with the floor. The declination circle is read by two telescopes attached to the tube near the eye-end.

There are also coarse circles in both hour angle and declination, and a dial which indicates directly the settings in right ascension and declination. This dial is attached to the slide mentioned above, and was designed by Prof. WM. HARKNESS, U. S. N.

The finders.—There are two finders of 5 inches and 2⅛ inches aperture, respectively. The larger one, by ALVAN CLARK and Sons, has a focal length of 78 inches, and is fastened to the tube near the eye-end and on the opposite side from the declination axis. The eyepiece generally used with this finder has a magnifying power of 35 diameters and a field of 1° 18′.

The smaller finder, by KAHLER, has a focal length of 21 inches. It is situated 60° in position angle from the larger one and has an eyepiece magnifying about 12 diameters and a field of over 3°. Both finders, as well as the two telescopes for reading the declination circle, were taken from the original mounting of the telescope.

The driving clock.—The driving clock is located in the upper section of the column and is driven by a weight which is wound up by hand. It has the ordinary type of double conical pendulum and is provided with an electric control. However, it has never been necessary to use the latter. The clock is so geared that the pendulum makes 90 revolutions per minute, and motion is communicated to the polar axis by means of a continuous worm gear of bronze. The worm screw is of steel. Extra gears are provided for changing from a sidereal rate to a mean solar or a mean lunar rate.

The driving clock has periodic errors, which are quite troublesome in making accurate measures. The most pronounced one has a period of exactly four minutes and an amplitude of about 1″. This error seems to be superimposed upon another of longer period. The following diagrams have been plotted from settings of the movable micrometer wire on a star at intervals of 20 seconds of time while the clock was driving the telescope, on the night of September 25, 1908. The settings for the upper diagram were made by Prof. ASAPH HALL jr., U. S. N., and those for the lower one by Assistant Astronomer J. C. HAMMOND. The ordinates are the readings of the micrometer and the abscissæ are the times. A difference of 100 in the micrometer readings corresponds to 1″.

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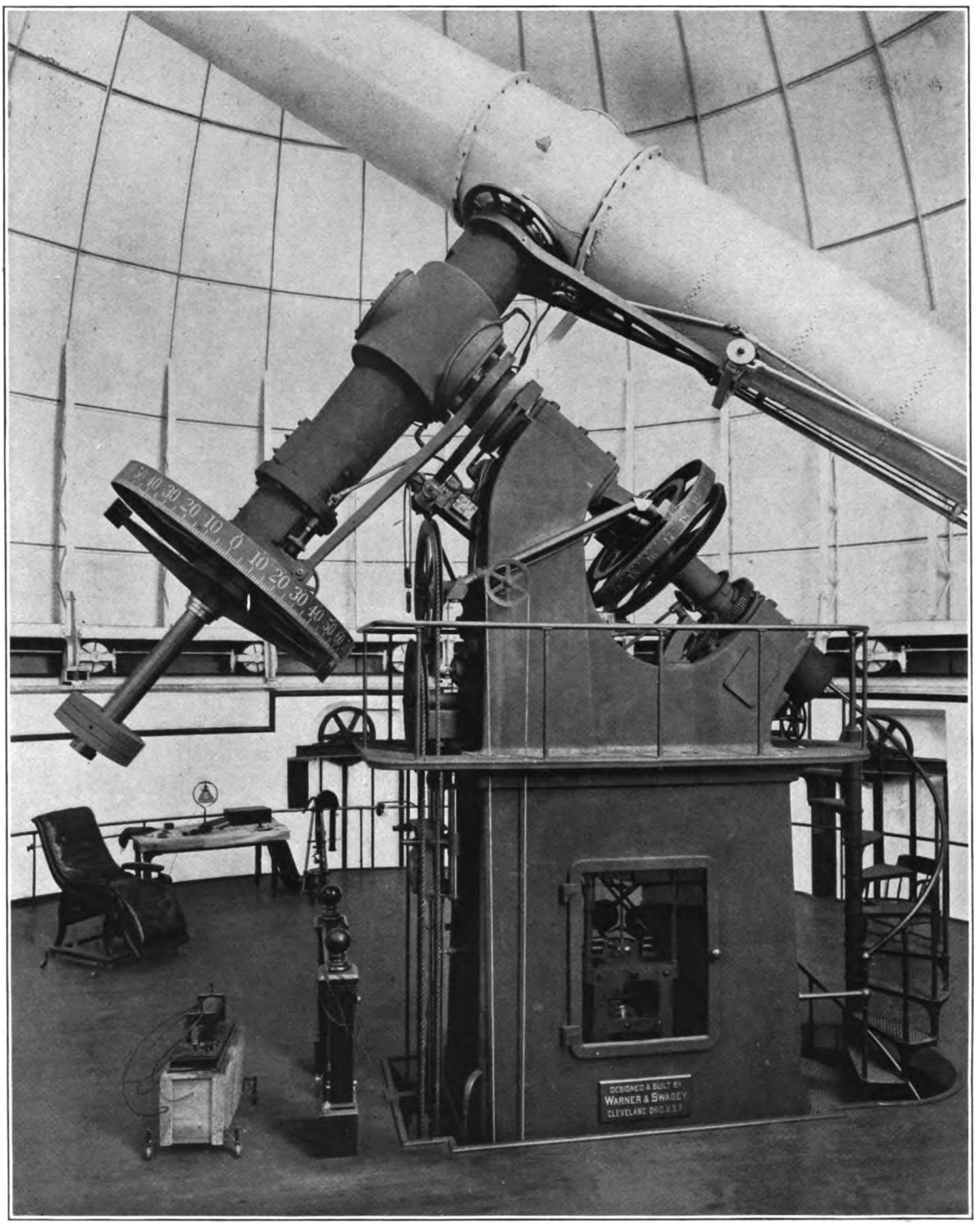

THE 26-INCH EQUATORIAL WITH VIEW OF THE DRIVING CLOCK.

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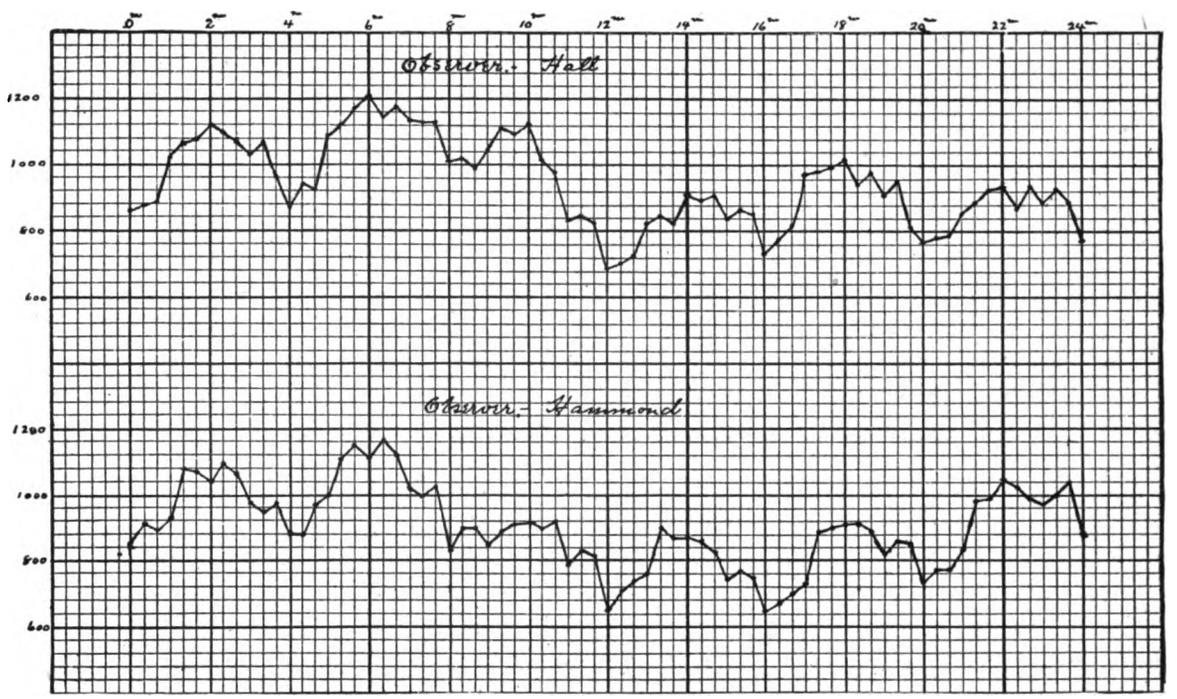
Diagram Showing Periodic Errors of Driving Clock.



The error with a period of four minutes is very conspicuous. However, its cause is difficult to locate for the following reason:

A vertical shaft (A), carrying the governors and making 90 revolutions per minute, has on its base a small bevel gear (a) of 20 teeth. The latter works in another bevel gear (b) of 90 teeth on a horizontal shaft (B). This last revolves at the rate of 20 revolutions per minute and has on it another gear (b′) of 19 teeth which engages a gear (c) of 95 teeth on a shaft (C). The shaft (C) makes 4 revolutions per minute and has on it another gear (c′) of 24 teeth which works in a gear (d) of 96 teeth. The latter is on a shaft (D) making 1 revolution per minute. On (D) is another gear (d′) of 24 teeth which engages a gear (e) of 96 teeth. The gear (e) is on a shaft (E) making 1 revolution in four minutes. On (E) is a small gear which connects with the drum carrying the driving weight and also another gear (e′) of 72 teeth. The gear (e′) works in a gear (f) of 72 teeth on a shaft (F). On this shaft (F) is a gear (f′) of 84 teeth which communicates motion to a gear (g) of 84 teeth which in turn communicates motion to another gear (h) with 84 teeth. Gear (h) is on a shaft (H) which has on it a bevel gear (h′) of 50 teeth engaging another (k) of 50 teeth. The bevel gear (k) is on the shaft (K) which communicates the motion directly to the worm screw (L) by means of two auxiliary bevel gears (k′) and (l) of 50 teeth each.

Now the gears e, e′, f, f′, g, h, h′, k, k′, and l, as well as the worm screw L, all run at the rate of 1 revolution in four minutes. The error may be caused by any one of the above gears, by the worm screw, or by the worm wheel itself; or it may be due to a combination of several or all of them. A thorough investigation is necessary to locate the trouble definitely. If, however, the four-minute error could

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by any means be eliminated, the remaining error would be of such a long period that it would not be troublesome.

Other details.—Rapid motion to the instrument in hour angle and declination is given by means of two ropes working over pulleys on the north side of the column. These are thrown out of gear when not in use. This arrangement is very convenient for operating a large telescope.

At the eye-end, convenient for use, are four handles which operate the clamps and slow motions. On December 7, 1897, auxiliary gears were introduced to reduce the speeds of the slow motions.

PLATE V shows the eye-end of the telescope with the two finders, the two telescopes for reading the declination circle, the handles for operating the clamps and slow motions, the focussing rack and the micrometer.

The great equatorial building.—A general view of the building which contains this instrument is given by the frontispiece. The walls are of brick faced with rough white marble. On the north side of the building are two office rooms separated by a hall which leads directly to the dome.

During the summer of 1899 the walls and floor of the basement and the cement pier were insulated from the basement by a double wall and floor of matched pine with heavy tarred paper between. The hydraulic apparatus for elevating the floor was also encased in the same way, so that the temperature of the basement may be kept nearly the same as that of the outside air. Previous to this, radiation from the massive stone walls, the pier, and cement floor caused troublesome air currents.

The following readings of three thermometers—one placed in the slit of the dome, one on top of the column, and one on the north side of the room—show the difference in temperature between the air outside and that inside the dome under various conditions.

Wash. M. T.	Slit.	Column.	North Side.
1908, October 14. Shutters opened at $7^h\ 30^m$			
h m	°	°	°
9 22	54.9	56.0	56.1
10 38	54.2	54.8	55.5
12 34	51.0	52.6	53.1
14 29	49.7	51.3	51.8
1908, October 15. Shutters opened at $4^h\ 50^m$			
7 19	68.5	67.4	65.0
8 10	67.1	66.3	64.5
9 28	65.7	64.8	63.9
10 47	63.3	63.0	63.0
12 38	60.4	61.0	61.0
1908, October 16. Shutters opened at $7^h\ 5^m$			
7 58	68.5	68.8	67.0
9 44	67.1	67.3	66.3
14 6	60.6	61.7	61.8

Wash. M. T.	Slit.	Column.	North Side.
1908, October 17. Shutters opened at $7^h\ 20^m$			
h m	°	°	°
8 3	71.6	71.2	69.2
9 35	68.9	69.5	68.2
10 36	68.0	67.7	67.9
1908, October 20. Shutters opened at $5^h\ 0^m$			
10 11	47.0	49.4	50.3
12 6	45.0	47.8	47.9
13 0	44.5	47.1	47.[illegible]
1908, October 26. Shutters opened at $4^h\ 0^m$			
7 20	66.2	65.5	65.3
8 6	65.6	65.2	65.2
8 53	64.0	64.7	65.1
9 58	63.0	63.6	64.0
11 16	61.5	63.0	63.9
12 17	61.0	62.5	62.8

Wash. M. T.	Slit.	Column.	North Side.
1908, November 12. Shutters opened at $4^h\ 0^m$			
h m	°	°	°
6 53	37.7	39.0	39.1
7 31	36.9	38.6	38.5
7 57	36.4	38.3	38.7
8 28	34.7	36.8	37.9
9 10	34.1	35.9	37.1
9 46	34.5	36.3	37.1
10 33	34.6	36.1	37.1
11 42	34.4	35.5	36.2
13 40	32.8	34.2	35.0

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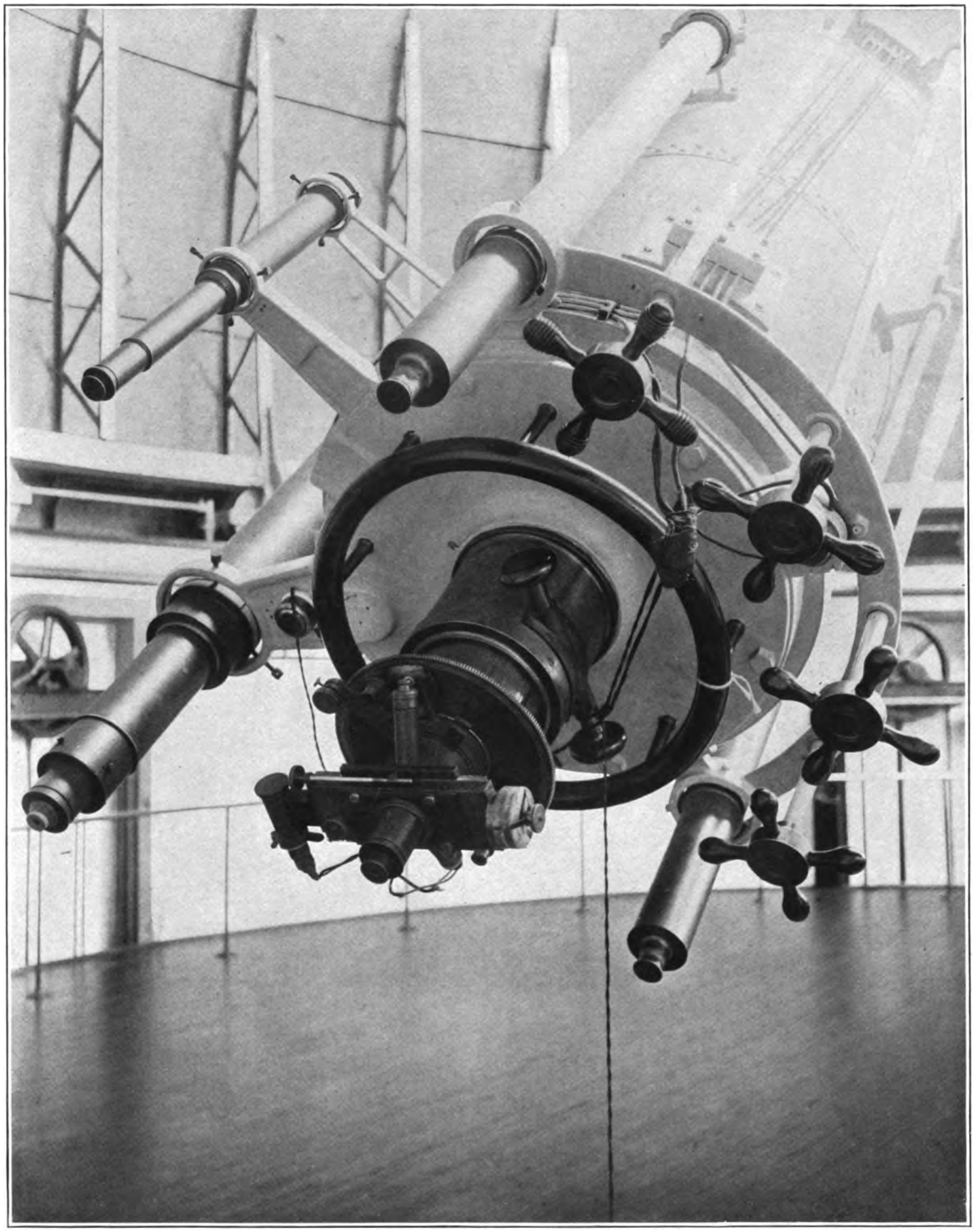

THE EYE-END OF THE 26-INCH EQUATORIAL—SHOWING THE MICROMETER, TWO FINDERS, TWO MICROSCOPES FOR READING THE DECLINATION CIRCLE, CLAMP AND SLOW-MOTION HANDLES, AND FOCUSING RACK.

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The elevating floor.—The elevating floor, designed and constructed by The WARNER and SWASEY Company, is circular, 40 feet 6 inches in diameter, and has a rise of 12 feet. It is raised by means of four hydraulic rams, each having a piston 8 inches in diameter with a 12-foot stroke. These rams are controlled by a valve actuated by a lever on the northwest side of the floor.

In order to keep the floor always level while in motion, two parallel shafts are provided, geared so that both shall revolve at the same speed. On the ends of these two shafts are four steel pinions, working in perpendicular racks bolted to iron plates in the wall. These racks also serve as guides to the floor in moving up or down.

The floor is nearly counterbalanced by means of cast-iron weights working up and down in six recesses in the wall. The water pressure for working the rams was at first obtained from a pair of steam pumps situated in the basement of the main building. When the new high-service reservoir was connected with the city mains, it was found that the pressure in them was about 74 pounds per square inch, which is sufficient to operate the floor. Accordingly, on December 7, 1896, the use of the steam pumps was discontinued and connection was made with the city mains. This direct water pressure, reenforced at present by air pressure from a tank in the basement of the main building, has been in use continuously to the present time.

On May 24, 1898, a small relief cock was inserted in the top of each ram for releasing the air which collects there and which would cause the floor to move in an irregular manner.

In September, 1900, a new control valve was installed to control the motion of the rams, and the floor has worked satisfactorily since that time.

The dome.—The steel dome, made by The WARNER and SWASEY Company, is 45 feet in diameter with a slit 6 feet 2 inches wide running from the base to a point a few feet beyond the zenith. When the shutters are opened to the widest extent, there is a clear aperture of 5 feet 8 inches. The dome is carried on wheels which run on a circular track. The latter is double, the distance between the centers being about 13 inches. The wheels are arranged in sets of three, the wheels of each set being fixed solidly on one axis. The outer and inner wheels of each set roll on the double track, while the middle wheel carries the dome. There are in all 22 sets of wheels, equally spaced around the track and rigidly connected by rods. The diameter of the inner wheels is about 15 inches.

The dome is kept in place by horizontal guide wheels running between the two tracks. Nine claws projecting under the inner track serve to protect the dome from being blown from the track.

In August, 1899, cork paint was applied to the inner surface of the dome to prevent moisture condensing on it and dripping on the instrument.

The dome may be turned by means of a hand rope, the motion of the rope being originally ten times that of the circumference of the dome. In June, 1896, the gearing was altered so that the motion of the rope was only five times that of the dome. Under these conditions, a weight of 19 pounds is sufficient to start it.

In October, 1907, a motor for turning the dome was installed by Mr. J. E. HURLEY, of Washington, D. C. (See Plate VI.) This motor is a single-phase alternating-current induction motor of one horse-power, made by the WESTINGHOUSE Electric Co. of Pittsburg. It runs at a speed of 1,700 revolutions per minute, and is

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connected with a sprocket wheel keyed on the hand-rope shaft. The speed is reduced by intermediate gears, so that the hand-rope wheel makes only 35 revolutions per minute and the motion is transmitted by means of the RENOLD silent-chain gears, which will run in either direction.

The motor is reversible, and the dome can be turned completely around in either direction in about three minutes. A cast-iron bracket, fastened to the top of the wall near the hand-rope wheel, supports the motor and intermediate gears.

No trouble has been experienced from either the motor or the chain gears, and both have performed with entire satisfaction.

Illumination of dome and instrument.—During the fiscal year ending June 30, 1901, the illumination of the dome and instrument was entirely rearranged and materially improved by Assistant W. W. DINWIDDIE. During the next year two contact rings were added to the instrument for conveying the electric current from the pier to the eye-end of the telescope. These rings were designed by Mr. DINWIDDIE, and constructed by KAHLER, of Washington, D. C. Each ring has five conductors, making it possible to have four independent circuits. The ring about the polar axis is attached to the right ascension clamp and turns with the axis, while its brush is fastened to the case of the worm screw. The other ring is fastened to the declination sleeve and its brush to the declination clamp ring.

The brushes have five conductors, separately insulated, to correspond to the number of conductors on the rings. Each conductor of the brush has four contact pins, and each pin is pressed against the ring by a separate spring, making it impossible for a dust particle on the ring to interrupt the circuit.

During the fiscal year ending June 30, 1903, a new system of wiring was installed. A switchboard placed in the hall now controls all the lights in the building. From this board a circuit runs to a second switchboard on the elevating floor, which controls all the lights in the dome and on the instrument.

A 110-volt commercial lighting circuit is now used for all illumination, thus doing away with the batteries formerly employed with the micrometer lamps. Standard lamps are used for illuminating the circles and micrometer in place of the special lamps previously used. The lamps for the hour circle are 28-volt and 2 candle-power; for the declination circle and the micrometer, 4-volt and 2 candle-power. Resistance coils for varying the brightness of both sets of threads of the micrometer are placed under the floor and controlled by rheostat switches on the switchboard.

This system of wiring, which gives entire satisfaction, was installed by Mr. DINWIDDIE, who deserves the greatest credit for the many improvements to this instrument which have added greatly to its efficiency.

A bright-field illumination was devised and installed by Assistant C. W. FREDERICK in 1904 by reflecting light from a small 2 candle-power lamp to the inner surface of the objective by means of a prism within the telescope tube near the eye-end and just outside the cone of rays. The mechanical parts were later improved by Mr. DINWIDDIE. This arrangement furnishes a good illumination for magnifying powers up to 400, but when a higher magnifying power is used the field becomes too faint to see the threads well.

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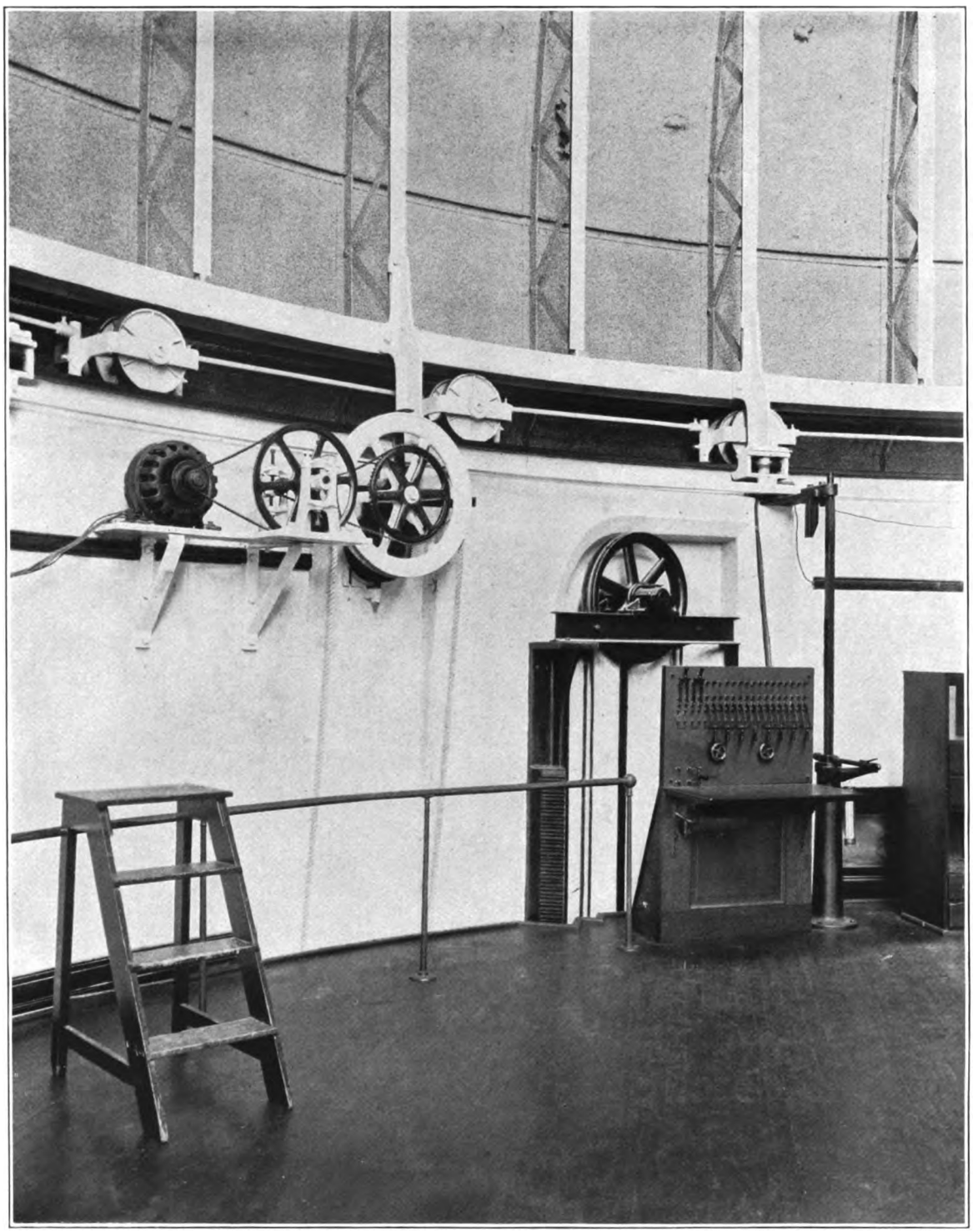

THE MOTOR FOR TURNING THE DOME AND THE SWITCHBOARD FOR CONTROLLING THE ILLUMINATION OF THE 26-INCH EQUATORIAL.

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The spectroscope.—The following description of the spectroscope (see PLATE VII) was taken partly from a report by Prof. S. J. BROWN, U. S. N., in the annual report of the Superintendent for the fiscal year ending June 30, 1899, and partly furnished by Assistant G. H. PETERS, who worked with Professor BROWN on the instrument.

The spectroscope was constructed by the JOHN A. BRASHEAR Co., of Allegheny, Pa., and is similar in all respects to that in use at the Allegheny Observatory and designed by its Director, Prof. J. E. KEELER. It is fitted with an adapter, the counterpart of that in use with the micrometer, so that the two are easily interchangeable. It can be used with a ROWLAND grating, of 14,438 lines to the inch. It has a single 60° flint-glass prism, with minimum deviation apparatus and also a battery of three 60° flint-glass prisms with automatic minimum deviation apparatus. An observing telescope with a micrometer for visual observations was supplied, and also photographic lenses with camera attachment. Comparison spectra apparatus is also a part of the equipment.

Spectroscopic work for determining the motion of certain stars in the line of sight was undertaken in November, 1898.

The spectroscope was returned to BRASHEAR in March, 1899, with instructions to substitute for the original prism box a new and much stronger one; to provide a HUGGINS slit with polished speculum metal jaws for the collimator; to provide two new photographic plate-holders, and to furnish a correcting lens, which would alter the focal curve of the equatorial objective in such a way as to shift the position of minimum focal distance from the FRAUNHOFER line E=λ 5270 to the neighborhood of Hγ=λ 4341. These alterations and additions were successfully made and the spectroscope was returned in June, 1899.

The work in the line of sight was never carried beyond the experimental stage, owing to inherent instrumental difficulties, and it was finally abandoned in September, 1900. It was found that, owing to the strong colors existing in the flint and crown glasses of the equatorial objective, the instrument was almost worthless for spectroscopic investigations by photographic methods in the blue region. The flint lens is of a decided yellow tint, while the crown lens is very green, producing a remarkable degree of absorption in the region of the spectrum employed.

It was concluded that to overcome this difficulty of the absorption of the blue rays by the large objective it would be necessary to work near the red end of the spectrum, using ortho-chromatic plates. In view, however, of the decreased dispersion by prisms in this region, it was decided to be impracticable. The equatorial is also supplied with a direct-vision spectroscope, which can be attached to one side of the tube. This spectroscope was furnished with the instrument by its makers, The WARNER and SWASEY Company.

The camera.—During the fiscal year 1901–02 a 6-inch DALLMEYER portrait lens of 40 inches focal length, with a camera attachment, was mounted on the central section of the telescope tube opposite the declination axis. The camera was adapted for 4″ x 5″ plates, and was used in the search for asteroids. In this work, of course the large telescope was used merely for following purposes and the arrangement was only temporary. The camera was removed from the instrument in May, 1906, and mounted on a special telescope constructed for that purpose.

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The Clark Micrometer I.—This is the micrometer that was used continuously by Prof. ASAPH HALL, U. S. N., from 1877 to 1892. The screw of this micrometer was investigated by Prof. E. S. HOLDEN, U. S. N., and the results are published in the Washington Astronomical Observations for 1877, Volume XXIV, Appendix I. He concludes that "the screw of Micrometer I is practically perfect and requires no correction for inequalities in the whole revolutions or for periodic errors." The screw of this micrometer was again examined by Lieut. W. H. ALLEN, U. S. N., in 1886 and by Professor HALL in 1891, and their results are published in the Washington Astronomical Observations for 1888, Appendix I, page E 8 et seq.

The corrections for periodic errors were, respectively,

$$\varphi(u) = +0''.0087 \sin u - 0''.0005 \cos u - 0''.0002 \sin 2u + 0''.0052 \cos 2u \ldots\ldots \text{ALLEN}$$
$$\varphi(u) = +0''.0016 \sin u + 0''.0019 \cos u - 0''.0027 \sin 2u - 0''.0016 \cos 2u \ldots\ldots \text{HALL}$$

The illumination for this micrometer was furnished by a hand lamp which threw a red light on the wires through an opening in the end of the micrometer box. There were but four wires in the micrometer, one fixed longitudinal wire, and at right angles to this one movable wire and two fixed wires, usually designated as Wire A and Wire B. The coincidence of the movable wire with Wire A was about 64 revolutions, and with Wire B 93 revolutions.

This micrometer was in use until March, 1900, when it was replaced by Micrometer II. The value of one revolution of the screw of Micrometer I used in reducing all the observations made with it and which are published in this volume is

$$R = 9''.9360$$

This is the value determined by Prof. ASAPH HALL from his later measurements of the differences in declination of certain well-known stars and published in the Washington Astronomical Observations for 1891, page XLVII.

The Clark Micrometer II.—This micrometer was made by ALVAN CLARK and Sons. The screw was investigated by Professor HOLDEN in the same manner as that of Micrometer I, and the results are published in the Washington Astronomical Observations for 1877, Volume XXIV, Appendix I. Again he concludes that "the screw of Micrometer II between 0 and 80 revolutions is practically perfect and requires no correction for inequalities of whole revolutions nor for periodic error."

This micrometer was fitted with an electric illumination by The WARNER and SWASEY Company in December, 1899, and was placed on the instrument in March, 1900. It has been used continuously to the present time.

Micrometer II has five fixed longitudinal wires placed parallel to each other at intervals of about 90″. These threads are used for taking transits when differences of right ascension are measured by the method of transits. The middle thread of the five has usually been used in measuring position angles. At right angles to this set of threads is one fixed thread and three movable threads rigorously parallel to this fixed thread and carried on a slide attached to the micrometer screw. These threads are numbered I, II, and III in order from the micrometer head. The intervals between these threads are approximately I–II=312″, II–III=312″, and I–III=624″. The coincidences of the three threads with the fixed thread vary with the temperature, but are approximately 68.500 revolutions for I, 100.000 revolutions for II, and 131.400 revolutions for III.

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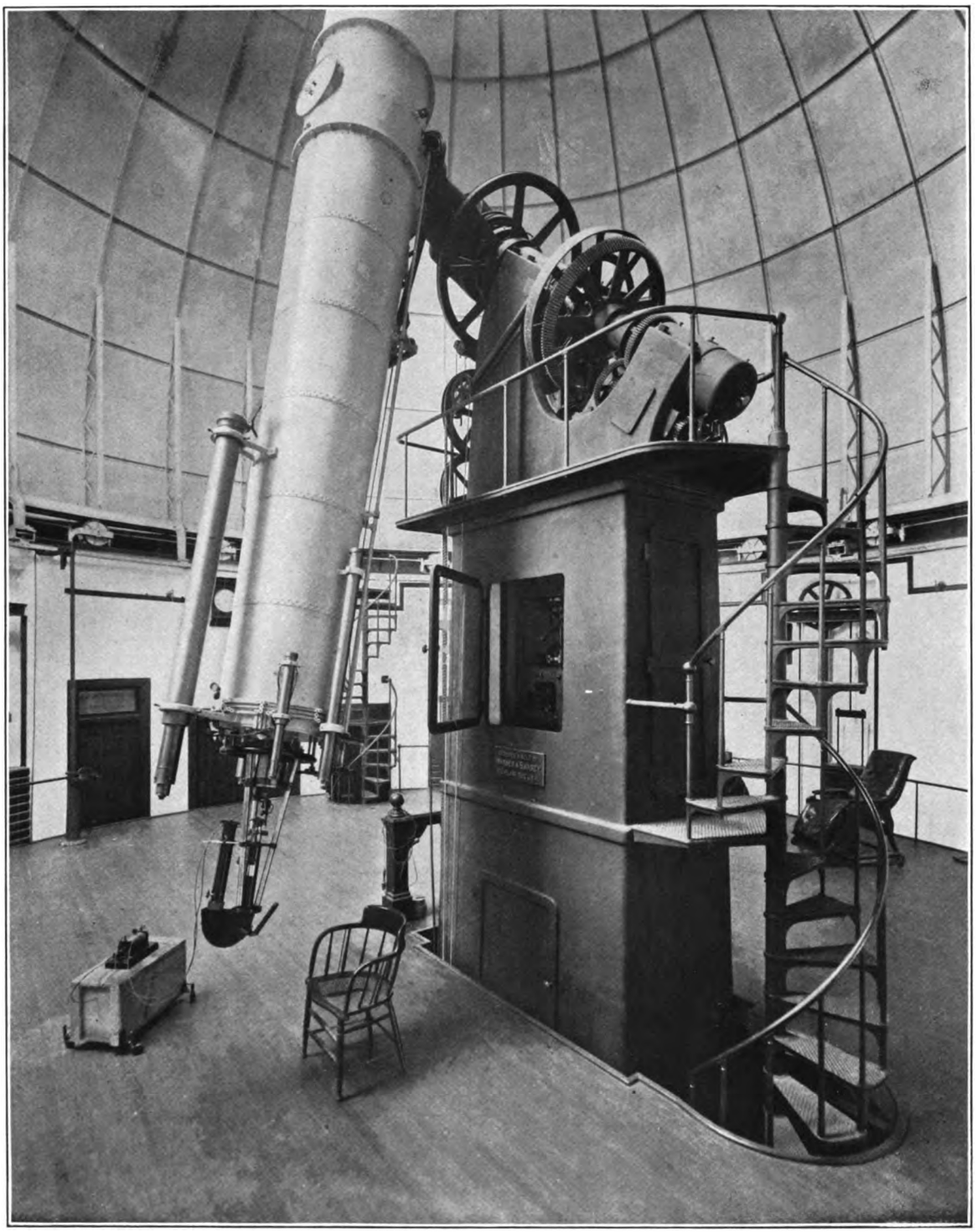

THE 26-INCH EQUATORIAL WITH SPECTROSCOPE ATTACHED.

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The illumination at present is as follows: One lamp at the end of the micrometer box illuminates the movable wires and the fixed wire parallel to them, directly and by reflection from a cylindrical mirror on the opposite side. The five longitudinal wires are illuminated by two lamps on a collar having a slight rotary motion. These lamps are placed at an angle of about 45° to the tube of the telescope and are 180° apart. The lamps employed are 2 candle-power.

In April, 1908, the screw of this micrometer was again investigated for inequalities by Prof. ASAPH HALL, jr., and Assistant Astronomer J. C. HAMMOND with the Ruled Glass Scale Comparator which is described in the Washington Astronomical Observations for 1877, Volume XXIV, Appendix I, page 12 et seq. This comparator has a slide rest bearing a micrometer eyepiece denoted in the following as Micrometer A.

The method of procedure was as follows: Micrometer II was placed on the comparator so that its screw was parallel to the motion of this slide rest, and Micrometer A was focussed on the threads of Micrometer II. The latter was then set at a whole revolution and several settings of A were made on a wire of II. This movable wire of II was then moved by a quarter revolution and more settings made with A. This was continued throughout a whole revolution of II and back to the starting point. Then Micrometer II was set at the next whole revolution and the slide rest moved forward, care being exercised that Micrometer A should read about the same for the beginning of each revolution of II. In this way each revolution of Micrometer II was measured with the same part of the screw of Micrometer A. This was done for each revolution from 70 to 130.

Then from 95 to 103 revolutions, each quarter revolution of Micrometer II was measured with the same part of A. The first set of measures would show the inequalities in the whole revolutions of II if any existed; the second set would determine the periodic errors. The results are given in the following tables. One revolution of Micrometer A corresponds to 3″.049.

TABLE I.—*Showing Inequalities in the Whole Revolutions.*

Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.
II.	A.		II.	A.		II.	A.		II.	A.	
rev.	rev.	″	rev.	rev.	″	rev.	rev.	″	rev.	rev.	″
70–71	3.249	+0.024	85– 86	3.261	−0.012	100–101	3.269	−0.037	115–116	3.261	−0.012
71–72	3.256	+0.003	86– 87	3.258	−0.003	101–102	3.267	−0.030	116–117	3.267	−0.030
72–73	3.276	−0.058	87– 88	3.263	−0.018	102–103	3.268	−0.034	117–118	3.260	−0.009
73–74	3.268	−0.034	88– 89	3.249	+0.024	103–104	3.264	−0.021	118–119	3.261	−0.012
74–75	3.254	+0.009	89– 90	3.252	+0.015	104–105	3.267	−0.030	119–120	3.254	+0.009
75–76	3.254	+0.009	90– 91	3.260	−0.009	105–106	3.260	−0.009	120–121	3.275	−0.055
76–77	3.264	−0.021	91– 92	3.254	+0.009	106–107	3.257	0.000	121–122	3.260	−0.009
77–78	3.234	+0.070	92– 93	3.241	+0.049	107–108	3.264	−0.021	122–123	3.258	−0.003
78–79	3.230	+0.082	93– 94	3.259	−0.006	108–109	3.260	−0.009	123–124	3.238	+0.058
79–80	3.243	+0.043	94– 95	3.255	+0.006	109–110	3.262	−0.015	124–125	3.251	+0.018
80–81	3.253	+0.012	95– 96	3.256	+0.003	110–111	3.253	+0.012	125–126	3.251	+0.018
81–82	3.263	−0.018	96– 97	3.244	+0.040	111–112	3.250	+0.021	126–127	3.250	+0.021
82–83	3.239	+0.055	97– 98	3.260	−0.009	112–113	3.260	−0.009	127–128	3.246	+0.034
83–84	3.248	+0.034	98– 99	3.255	+0.006	113–114	3.262	−0.015	128–129	3.250	+0.021
84–85	3.259	−0.006	99–100	3.274	−0.052	114–115	3.258	−0.001	129–130	3.260	−0.009

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These residuals are small and are probably due to accidental errors in setting Micrometer A. The largest residual, 0″.082, is less than the accidental errors in the observations of any night.

TABLE II.—*Showing Inequalities in the Quarter Revolutions as Measured by Different Parts of Micrometer A.*

Micrometer II.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Residuals from Mean.			
					First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev	″	″	″	″
70– 71	0.814	0.822	0.800	0.813	0.000	−0.024	+0.043	+0.003
71– 72	0.818	0.809	0.831	0.798	−0.012	+0.015	−0.052	+0.049
72– 73	0.817	0.817	0.836	0.806	−0.009	−0.009	−0.067	+0.024
73– 74	0.810	0.832	0.811	0.815	−0.012	−0.055	+0.009	−0.003
74– 75	0.817	0.811	0.826	0.800	−0.009	+0.009	−0.037	+0.043
75– 76	0.798	0.810	0.824	0.822	+0.049	+0.012	−0.030	−0.024
76– 77	0.808	0.810	0.830	0.816	+0.018	+0.012	−0.049	−0.006
77– 78	0.795	0.827	0.824	0.788	+0.058	−0.040	−0.030	+0.079
78– 79	0.791	0.798	0.833	0.808	+0.070	+0.049	−0.058	+0.018
79– 80	0.806	0.817	0.816	0.804	+0.024	−0.009	−0.006	+0.030
80– 81	0.814	0.815	0.813	0.811	0.000	−0.003	+0.003	+0.009
81– 82	0.806	0.806	0.830	0.821	+0.024	+0.024	−0.049	−0.021
82– 83	0.800	0.814	0.823	0.802	+0.043	0.000	−0.027	+0.037
83– 84	0.804	0.820	0.826	0.798	+0.030	−0.018	−0.037	+0.049
84– 85	0.813	0.821	0.812	0.813	+0.003	−0.021	+0.006	+0.003
85– 86	0.811	0.816	0.815	0.819	+0.009	−0.006	−0.003	−0.015
86– 87	0.813	0.820	0.806	0.819	+0.003	−0.018	+0.024	−0.015
87– 88	0.814	0.820	0.812	0.817	0.000	−0.018	+0.006	−0.009
88– 89	0.803	0.821	0.812	0.813	+0.034	−0.021	+0.006	+0.003
89– 90	0.812	0.816	0.814	0.810	+0.006	−0.006	0.000	+0.012
90– 91	0.812	0.824	0.810	0.814	+0.006	−0.030	+0.012	0.000
91– 92	0.807	0.812	0.822	0.813	+0.021	+0.004	−0.024	+0.003
92– 93	0.791	0.817	0.822	0.811	+0.070	−0.009	−0.024	+0.009
93– 94	0.813	0.831	0.812	0.803	+0.003	−0.052	+0.006	+0.034
94– 95	0.808	0.818	0.822	0.807	+0.018	−0.012	−0.024	+0.021
95– 96	0.805	0.806	0.832	0.813	+0.027	+0.024	−0.055	+0.003
96– 97	0.802	0.814	0.824	0.804	+0.037	0.000	−0.030	+0.030
97– 98	0.814	0.811	0.829	0.806	0.000	+0.009	−0.046	+0.024
98– 99	0.808	0.819	0.805	0.823	+0.018	−0.015	+0.027	−0.027
99–100	0.822	0.806	0.830	0.816	−0.024	+0.024	−0.049	−0.006
100–101	0.815	0.814	0.822	0.818	−0.003	0.000	−0.024	−0.012
101–102	0.820	0.814	0.826	0.807	−0.018	0.000	−0.037	−0.021
102–103	0.816	0.821	0.823	0.808	−0.006	−0.021	−0.027	+0.018
103–104	0.812	0.811	0.819	0.822	+0.006	+0.009	−0.015	−0.024
104–105	0.818	0.806	0.829	0.814	−0.012	+0.024	−0.046	0.000
105–106	0.806	0.820	0.827	0.807	+0.024	−0.018	−0.040	+0.021
106–107	0.802	0.822	0.824	0.809	+0.037	−0.024	−0.030	+0.015
107–108	0.818	0.805	0.831	0.810	−0.012	+0.027	−0.052	+0.012
108–109	0.800	0.818	0.827	0.815	+0.043	−0.012	−0.040	−0.003
109–110	0.803	0.819	0.827	0.813	+0.034	−0.015	−0.040	+0.003
110–111	0.808	0.829	0.808	0.808	+0.018	−0.045	+0.018	+0.018
111–112	0.808	0.824	0.810	0.808	+0.018	−0.030	+0.012	+0.018

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TABLE II.—*Showing Inequalities in the Quarter Revolutions as Measured by Different Parts of Micrometer A*—Continued.

Micrometer II.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Residuals from Mean. First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev.	"	"	"	"
112–113	0.809	0.803	0.830	0.818	+0.015	+0.034	−0.049	−0.012
113–114	0.805	0.821	0.821	0.815	+0.027	−0.021	−0.021	−0.003
114–115	0.811	0.808	0.833	0.806	+0.009	+0.018	−0.058	+0.024
115–116	0.810	0.813	0.824	0.814	+0.012	+0.003	−0.030	0.000
116–117	0.812	0.815	0.831	0.809	+0.006	−0.003	−0.052	+0.015
117–118	0.800	0.828	0.817	0.815	+0.043	−0.043	−0.009	−0.003
118–119	0.811	0.810	0.828	0.812	+0.009	+0.012	−0.043	+0.006
119–120	0.803	0.825	0.818	0.808	+0.034	−0.034	−0.012	+0.018
120–121	0.813	0.818	0.826	0.818	+0.003	−0.012	−0.037	−0.012
121–122	0.808	0.811	0.829	0.812	+0.018	+0.009	−0.046	+0.006
122–123	0.806	0.823	0.819	0.810	+0.024	−0.027	−0.015	+0.012
123–124	0.809	0.813	0.808	0.808	+0.015	+0.003	+0.018	+0.018
124–125	0.807	0.816	0.822	0.806	+0.021	−0.004	−0.024	+0.024
125–126	0.794	0.816	0.822	0.819	+0.061	−0.006	−0.024	−0.015
126–127	0.804	0.818	0.818	0.810	+0.030	−0.012	−0.012	+0.012
127–128	0.795	0.823	0.813	0.815	+0.058	−0.027	+0.003	−0.003
128–129	0.804	0.818	0.822	0.806	+0.030	−0.012	−0.024	+0.024
129–130	0.823	0.808	0.814	0.815	−0.027	+0.018	0.000	−0.003

The preponderance of positive signs in the residuals for the first quarter and of negative signs in those of the third quarter seems to show that there is a small periodic error either in the screw of Micrometer II or in that of Micrometer A.

The mean of the residuals for the first quarter is ..... +0".0170
The mean of the residuals for the second quarter is ..... −0".0065
The mean of the residuals for the third quarter is ..... −0".0218
The mean of the residuals for the fourth quarter is ..... +0".0085

These residuals give the formula for periodic errors:

$$\varphi(u) = -0''.0060 \cos u + 0''.0135 \sin u + 0''.0008 \cos 2u.$$

TABLE III.—*Showing Inequalities in the Quarter Revolutions from 95 Revolutions to 103 Revolutions as Measured by the same Part of Micrometer A.*

Micrometer II.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Residuals from Mean. First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev.	"	"	"	"
95- 96	0.801	0.812	0.800	0.817	+0.021	−0.012	+0.024	−0.027
96- 97	0.793	0.804	0.804	0.811	+0.046	+0.012	+0.012	−0.009
97- 98	0.807	0.810	0.806	0.813	+0.003	−0.006	+0.006	−0.015
98- 99	0.800	0.804	0.805	0.802	+0.024	+0.012	+0.009	+0.018
99–100	0.806	0.811	0.809	0.815	+0.006	−0.009	−0.003	−0.021
100–101	0.813	0.807	0.805	0.811	−0.015	+0.003	+0.009	−0.009
101–102	0.809	0.814	0.815	0.817	−0.003	−0.018	−0.021	−0.027
102 103	0.815	0.805	0.812	0.813	−0.021	+0.009	−0.012	−0.015

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These residuals show that the periodic error in the screw of Micrometer II, if any exists, is inappreciable.

The mean of the residuals for the first quarter is ..... +0″.0076
The mean of the residuals for the second quarter is ..... −0″.0011
The mean of the residuals for the third quarter is ..... +0″.0030
The mean of the residuals for the fourth quarter is ..... −0″.0131

They give as the formula for periodic errors:

$$\varphi(u) = -0''.0042 \cos u - 0''.0018 \sin u - 0''.0031 \cos 2u.$$

The screw of Micrometer II shows no deterioration from wear but remains a very excellent one in all respects.

The value of one revolution of the screw of Micrometer II with which all the observations, made with it and published in this volume, have been reduced is one determined by Prof. T. J. J. See, U. S. N., from observations of arcs in the Pleiades and in Perseus. The results of his measures have been published in the introduction to his observations of Eros in 1900–1901. (See Publications of the United States Naval Observatory, Second Series, Volume III, Part I, page Avi et seq.) This value is

$$R = 9''.9328 - 0''.000055\ (T - 28°F.)$$

In January and February, 1906, some measures of four arcs in the Pleiades were made by Mr. Hammond, with the following results. The range of temperature during these observations was not sufficiently large to determine a temperature coefficient with any degree of accuracy and therefore this coefficient is omitted. The mean temperature was T=39° Fahrenheit. The focus was changed by 0.05 inch during the measures, the reading of the focal scale being 1.32 inches at the beginning and 1.27 inches at the end. A decrease of 0.05 inch in focal length of the instrument corresponds to an increase of 0″.0013 in the value of one revolution of the screw.

Focal scale ..... 1.32 inches.

Arc.	R	Number of Nights.
	″ ″	
Atlas-Pleione	9.9316 ± 0.0013	4
Alcyone-Bessel 24 ...	9.9331 ± 0.0002	2
Maia-Asterope	9.9310 ± 0.0007	2
Electra-Celaeno	9.9340 ± 0.0010	2
Mean	9.9324 (equal weights).	

Focal scale ..... 1.27 inches.

Arc.	R	Number of Nights.
	″ ″	
Atlas-Pleione	9.9330 ± 0.0005	5
Alcyone-Bessel 24 ...	9.9376 ± 0.0005	4
Maia-Asterope	9.9325 ± 0.0005	3
Electra-Celaeno	9.9356 ± 0.0007	3
Mean	9.9347 (equal weights).	

If we assign equal weight to the different determinations, we have as the value of one revolution of the screw

$$R = 9''.9336 \text{ at a temperature of } 39° \text{ Fahrenheit.}$$

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This is in good agreement with the value determined by Professor SEE for this temperature, viz:

$$R = 9''.9322$$

The Warner and Swasey micrometer.—This micrometer was made by The WARNER and SWASEY Company at the same time as the new mounting for the instrument. The threads are arranged similarly to those in the CLARK Micrometer II, except that it has only one fixed longitudinal wire. It is therefore not well adapted for measuring differences in right ascension by the method of transits. The wires are illuminated by a small electric lamp opposite the micrometer head. The value of one revolution of the screw has never been accurately determined, but is approximately 10".5. The coincidence of the middle movable thread with the fixed thread occurs at about 50.7 revolutions.

In March, 1908, the screw of this micrometer was investigated for periodic and progressive errors by Mr. HAMMOND in substantially the same way as was that of CLARK Micrometer II. The results are exhibited in TABLES IV, V, and VI.

TABLE IV.—*Showing Inequalities in the Whole Revolutions.*

Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.
W. and S.	A.		W.and S.	A.		W.and S.	A.		W.and S.	A.	
rev.	rev.	"	rev.	rev.	"	rev.	rev.	"	rev.	rev.	"
22–23	3.182	−0.010	37–38	3.452	−0.015	52–53	3.447	0.000	67–68	3.447	0.000
23–24	3.198	−0.087	38–39	3.441	+0.018	53–54	3.442	+0.015	68–69	3.451	−0.012
24–25	3.195	−0.073	39–40	3.444	+0.009	54–55	3.450	−0.009	69–70	3.441	+0.018
25–26	3.188	−0.039	40–41	3.470	−0.070	55–56	3.452	−0.015	70–71	3.447	0.000
26–27	3.194	−0.068	41–42	3.461	−0.043	56–57	3.449	−0.006	71–72	3.451	−0.012
27–28	3.192	−0.058	42–43	3.445	+0.006	57–58	3.455	−0.025	72–73	3.439	+0.025
28–29	3.188	−0.039	43–44	3.453	−0.018	58–59	3.447	0.000	73–74	3.448	−0.003
29–30	3.180	0.000	44–45	3.458	−0.034	59–60	3.442	+0.015	74–75	3.444	+0.009
30–31	3.163	+0.082	45–46	3.458	−0.034	60–61	3.437	+0.031	75–76	3.434	+0.040
31–32	3.161	+0.092	46–47	3.448	−0.003	61–62	3.444	+0.009	76–77	3.425	+0.067
32–33	3.162	+0.087	47–48	3.445	+0.006	62–63	3.454	−0.021	77–78	3.443	+0.012
33–34	3.151	+0.140	48–49	3.460	−0.040	63–64	3.440	+0.021	78–79	3.437	+0.031
34–35	*3.445	+0.006	49–50	3.455	−0.025	64–65	3.443	+0.012	79–80	3.453	−0.018
35–36	3.450	−0.009	50–51	3.437	+0.031	65–66	3.444	+0.009			
36–37	3.445	+0.006	51–52	3.452	−0.015	66–67	3.435	+0.037			

* At this point the focal adjustment of Micrometer A was changed.

There is nothing in these measures to show a progressive error in this screw. With one exception, these residuals are of the same order as those of the CLARK Micrometer II. The one larger residual, +0".140, is probably due to a large accidental error in setting Micrometer A for that revolution.

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TABLE V.—*Showing Inequalities in the Quarter Revolutions as Measured by Different Parts of Micrometer A.*

W. and S. Microm.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Residuals from Mean.			
					First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev.	"	"	"	"
22–23	0.794	0.806	0.799	0.783	+0.005	−0.053	−0.019	+0.058
23–24	0.797	0.794	0.807	0.800	−0.010	+0.005	−0.058	−0.024
24–25	0.796	0.804	0.807	0.788	−0.005	−0.044	−0.058	+0.034
25–26	0.794	0.807	0.793	0.794	+0 005	−0.058	+0.010	+0.005
26–27	0.790	0.805	0.799	0.800	+0.024	−0.048	−0.019	−0.024
27–28	0.806	0.790	0.797	0.799	−0.053	+0.024	−0.010	−0.019
28–29	0.800	0.805	0.790	0.794	−0.024	−0.048	+0.024	+0.005
29–30	0.790	0.805	0.790	0.794	+0.024	−0.048	+0.024	+0.005
30–31	0.792	0.787	0.786	0.797	+0.015	+0.039	+0.044	−0.010
31–32	0.789	0.800	0.784	0.788	+0.029	−0.024	+0.053	+0.034
32–33	0.794	0.785	0.787	0.795	+0.005	+0.048	+0.039	0.000
33–34	0.787	0.785	0.799	0.780	+0.039	+0.048	−0.019	+0.073
34–35*	0.858	0.862	0.862	0.862	+0.012	0.000	0.000	0.000
35–36	0.858	0.857	0.871	0.864	+0.012	+0.015	−0.028	−0.006
36–37	0.860	0.856	0.874	0.854	+0.006	+0.018	−0.037	+0.025
37–38	0.865	0.852	0.875	0.860	−0.009	+0.031	−0.040	+0.006
38–39	0.860	0.854	0.873	0.853	+0.006	+0.025	−0.034	+0.028
39–40	0.856	0.859	0.864	0.864	+0.018	+0.009	−0.006	−0.006
40–41	0.858	0.864	0.869	0.878	+0.012	−0.006	−0.021	−0.049
41–42	0.870	0.865	0.853	0.873	−0.025	−0.009	+0.028	−0 034
42–43	0.863	0.862	0.858	0.862	−0.003	0.000	+0.012	0.000
43–44	0.866	0.862	0.864	0.861	−0.012	0.000	−0.006	+0.003
44–45	0.866	0.860	0.862	0.870	−0.012	+0.006	0.000	−0.025
45–46	0.870	0.848	0.880	0.860	−0.025	+0.043	−0.055	+0.006
46–47	0.856	0.863	0.864	0.865	+0.018	−0.003	−0.006	−0.009
47–48	0.861	0.859	0.869	0.856	+0.003	+0.009	−0.021	+0.018
48 49	0.862	0.861	0.863	0.874	0.000	+0.003	−0.003	−0.037
49 50	0.857	0.867	0.864	0.867	+0.015	−0.015	−0.006	−0.015
50 51	0.863	0.851	0.866	0.857	−0.003	+0.028	−0.012	+0.015
51 52	0.862	0.866	0.864	0.860	0.000	−0.012	−0.006	+0.006
52 53	0.864	0.853	0.865	0.865	−0.006	+0.028	−0.009	−0.009
53 54	0.854	0.857	0.874	0.857	+0.025	+0.015	−0.037	+0.015
54 55	0.861	0.852	0.866	0.871	+0.003	+0.031	−0.012	−0.028
55 56	0.860	0.861	0.867	0.864	+0.006	+0.003	−0.015	−0.006
56 57	0.856	0.864	0.868	0.861	+0.018	−0.006	−0.018	+0.006
57–58	0.863	0.864	0.870	0.868	−0.003	−0.006	−0.025	−0.018
58–59	0.856	0.864	0.860	0.867	+0.018	−0.006	+0.006	−0.015
59–60	0.859	0.855	0.870	0.858	+0.009	+0.021	−0.025	+0.012
60–61	0.856	0.860	0.869	0.852	+0.018	+0.006	−0.021	+0.031
61 62	0.860	0.852	0.871	0.861	+0.006	+0.031	−0.028	+0.003
62–63	0.862	0.856	0.868	0.868	0.000	+0.018	−0.018	−0.018
63–64	0.860	0.854	0.866	0.860	+0.006	+0.025	−0.012	+0.006
64–65	0.862	0.852	0.864	0.865	0.000	+0.031	−0.006	−0.009

* At this point the focal adjustment of Micrometer A was changed.

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TABLE V.—*Showing Inequalities in the Quarter Revolutions as Measured by Different Parts of Micrometer A*—Continued.

W. and S. Microm.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Residuals from Mean. First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev.	"	"	"	"
65-66	0.856	0.855	0.873	0.860	+0.018	+0.021	−0.034	+0.006
66-67	0.857	0.853	0.869	0.856	+0.015	+0.028	−0.021	+0.018
67-68	0.862	0.856	0.862	0.867	0.000	+0.018	0.000	−0.015
68-69	0.868	0.847	0.871	0.865	−0.018	+0.046	−0.028	−0.009
69-70	0.857	0.850	0.877	0.857	+0.015	+0.037	−0.046	+0.015
70-71	0.866	0.848	0.875	0.858	−0.012	+0.043	−0.040	+0.012
71-72	0.863	0.854	0.862	0.872	−0.003	+0.025	0.000	−0.031
72-73	0.861	0.856	0.868	0.854	+0.003	+0.018	−0.018	+0.025
73-74	0.863	0.855	0.860	0.870	−0.003	+0.021	+0.006	−0.025
74-75	0.862	0.854	0.862	0.866	0.000	+0.025	0.000	−0.012
75-76	0.855	0.848	0.871	0.860	+0.021	+0.043	−0.028	+0.006
76-77	0.864	0.852	0.861	0.848	−0.006	+0.031	+0.003	+0.043
77-78	0.860	0.858	0.862	0.863	+0.006	+0.012	0.000	−0.006
78-79	0.862	0.851	0.865	0.859	0.000	+0.028	−0.009	+0.009
79-80	0.879	0.856	0.866	0.852	−0.052	+0.018	−0.012	+0.031

The mean of the residuals for the first quarter is ..... +0".0026
The mean of the residuals for the second quarter is..... +0".0101
The mean of the residuals for the third quarter is ..... −0".0117
The mean of the residuals for the fourth quarter is ..... +0".0017

The formula for periodic errors is:

$$\varphi(u) = -0''.0057 \cos u + 0''.0015 \sin u + 0''.0026 \cos 2u.$$

TABLE VI.—*Showing Inequalities in the Quarter Revolutions from 47 Revolutions to 53 Revolutions as Measured by the Same Part of Micrometer A.*

W. and S. Microm.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Residuals from Mean. First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev.	"	"	"	"
47-48	0.865	0.858	0.869	0.860	−0.021	0.000	−0.034	−0.006
48-49	0.861	0.863	0.864	0.853	−0.009	−0.015	−0.018	+0.015
49-50	0.850	0.850	0.837	0.854	+0.025	+0.025	+0.064	+0.012
51-52	0.862	0.855	0.856	0.860	−0.012	+0.009	+0.006	−0.006
52-53	0.856	0.861	0.864	0.866	+0.006	−0.009	−0.018	−0.025

The mean of the residuals for the first quarter is..... −0".0022
The mean of the residuals for the second quarter is..... +0".0020
The mean of the residuals for the third quarter is..... +0".0000
The mean of the residuals for the fourth quarter is ..... −0".0020

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These residuals give as the formula for periodic errors:

$$\varphi(u) = -0''.0004 \cos u - 0''.0016 \sin u + 0''.0002 \cos 2u.$$

If any periodic error in this screw exists it must be extremely small. The screw seems to be a very excellent one in all respects. This micrometer has been used on two occasions only, and the adopted value of one revolution is 10″.565.

The double-image micrometer.—The instrument is provided with a double-image micrometer made by ALVAN CLARK and Sons. It has the advantage of a larger field of view than ordinary instruments of this construction.

The position circle.—The position circle, by The WARNER and SWASEY Company, is 9¼ inches in diameter and is graduated to half degrees. It is read by two verniers, designated as I and II, the least reading being 0°.02. Two determinations of the eccentricity of the position circle have been made, one by C. W. FREDERICK in October, 1903, and one by J. C. HAMMOND in September, 1905. (See TABLES VII, VIII.)

TABLE VII.—*Readings of the Two Verniers, by C. W. Frederick.*

Vernier I.	Vernier II.	I–II +180°	Vernier I.	Vernier II.	I–II +180°	Vernier I.	Vernier II.	I–II +180°	Vernier I.	Vernier II.	I–II +180°
°	°	°	°	°	°	°	°	°	°	°	°
0.025	180.005	+0.020	60.050	240.045	+0.005	250.005	70.010	−0.005	305.020	125.010	+0.010
4.995	184.975	+0.020	65.025	245.025	0.000	255.005	75.010	−0.005	310.035	130.020	+0.015
10.040	190.020	+0.020	70.030	250.030	0.000	260.015	80.020	−0.005	315.020	135.005	+0.015
15.035	195.020	+0.015	75.005	255.005	0.000	265.015	85.020	−0.005	320.025	140.015	+0.010
20.040	200.020	+0.020	80.020	260.020	0.000	270.005	90.005	0.000	325.025	145.015	+0.010
25.020	205.005	+0.015	85.005	265.005	0.000	275.025	95.025	0.000	330.035	150.020	+0.015
30.020	210.000	+0.020	90.025	270.025	0.000	280.005	100.000	+0.005	335.000	154.985	+0.015
35.000	214.985	+0.015	95.010	275.015	−0.005	285.010	105.005	+0.005	340.020	160.005	+0.015
40.045	220.035	+0.010	100.015	280.015	0.000	290.025	110.015	+0.010	345.045	165.025	+0.020
45.015	225.005	+0.010	105.015	285.020	−0.005	295.020	115.010	+0.010	350.015	169.995	+0.020
50.040	230.035	+0.005	109.990	289.995	−0.005	300.035	120.025	+0.010	355.015	175.000	+0.015
55.015	235.005	+0.010									

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TABLE VIII.—*Readings of the Two Verniers, by J. C. Hammond.*

Vernier I.	Vernier II.	I–II +180°	Vernier I.	Vernier II.	I–II +180°	Vernier I.	Vernier II.	I–II +180°	Vernier I.	Vernier II.	I–II +180°
°	°	°	°	°	°	°	°	°	°	°	°
0.00	179.980	+0.020	90.00	270.005	−0.005	180.00	0.020	−0.020	270.00	90.000	0.000
5.00	184.980	+0.020	95.00	275.005	−0.005	185.00	5.020	−0.020	275.00	95.000	0.000
10.00	189.980	+0.020	100.00	280.010	−0.010	190.00	10.020	−0.020	280.00	100.000	0.000
15.00	194.985	+0.015	105.00	285.010	−0.010	195.00	15.020	−0.020	285.00	104.990	+0.010
20.00	199.985	+0.015	110.00	290.015	−0.015	200.00	20.020	−0.020	290.00	109.990	+0.010
25.00	204.990	+0.010	115.00	295.015	−0.015	205.00	25.015	−0.015	295.00	114.985	+0.015
30.00	209.980	+0.020	120.00	300.015	−0.015	210.00	30.015	−0.015	300.00	119.985	+0.015
35.00	214.990	+0.010	125.00	305.020	−0.020	215.00	35.015	−0.015	305.00	124.985	+0.015
40.00	219.990	+0.010	130.00	310.020	−0.020	220.00	40.015	−0.015	310.00	129.980	+0.020
45.00	224.990	+0.010	135.00	315.025	−0.025	225.00	45.015	−0.015	315.00	134.980	+0.020
50.00	229.995	+0.005	140.00	320.025	−0.025	230.00	50.010	−0.010	320.00	139.980	+0.020
55.00	234.995	+0.005	145.00	325.025	−0.025	235.00	55.015	−0.015	325.00	144.975	+0.025
60.00	239.995	+0.005	150.00	330.025	−0.025	240.00	60.015	−0.015	330.00	149.980	+0.020
65.00	244.995	+0.005	155.00	335.025	−0.025	245.00	65.010	−0.010	335.00	154.980	+0.020
70.00	249.995	+0.005	160.00	340.030	−0.030	250.00	70.010	−0.010	340.00	159.980	+0.020
75.00	255.000	0.000	165.00	345.030	−0.030	255.00	75.015	−0.015	345.00	164.975	+0.025
80.00	260.000	0.000	170.00	350.025	−0.025	260.00	80.005	−0.005	350.00	169.980	+0.020
85.00	265.005	−0.005	175.00	355.020	−0.020	265.00	85.005	−0.005	355.00	174.980	+0.020

From these measures it will be seen that the eccentricity is small and no correction for it has been applied to the observations in position angle previous to the year 1903, although one vernier only was read. However, commencing with the year 1903 it was deemed advisable to apply such a correction to the observations of the satellites. It has been the custom since that time to observe always with the micrometer head up, and to read that vernier which gives the proper position angle. With the instrument east of the pier, position angles from 270° through 0° to 90° are read from Vernier I, and angles from 90° through 180° to 270° from Vernier II, and vice versa, for the instrument west of the pier.

If P is the reading of the vernier which gives the proper position angle, in distinction from the vernier 180° from it, then the reading P will require a correction for eccentricity.

Instrument east of pier $\begin{cases} \Delta P = +0^\circ.010 \sin (P - 90^\circ) \ldots\ldots\ldots\ldots\ldots\ldots \text{FREDERICK} \\ \Delta P = +0^\circ.011 \sin (P - 80^\circ) \ldots\ldots\ldots\ldots\ldots\ldots \text{HAMMOND} \end{cases}$

When the instrument is west of the pier the sign of the correction is changed.

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TABLE IX.—*Correction for Eccentricity of Position Circle with the Instrument East of the Pier and the Micrometer Head Up.*

P	ΔP Fk.	ΔP Hd.	P	ΔP Fk.	ΔP Hd.	P	ΔP Fk.	ΔP Hd.
°	°	°	°	°	°	°	°	°
0	−0.010	−0.011	60	−0.005	−0.004	120	+0.005	+0.007
5	−0.010	−0.011	65	−0.004	−0.003	125	+0.006	+0.008
10	−0.010	−0.010	70	−0.003	−0.002	130	+0.006	+0.008
15	−0.010	−0.010	75	−0.002	−0.001	135	+0.007	+0.009
20	−0.009	−0.010	80	−0.002	0.000	140	+0.008	+0.010
25	−0.009	−0.009	85	−0.001	+0.001	145	+0.008	+0.010
30	−0.009	−0.008	90	0.000	+0.002	150	+0.009	+0.010
35	−0.008	−0.008	95	+0.001	+0.003	155	+0.009	+0.011
40	−0.008	−0.007	100	+0.002	+0.004	160	+0.009	+0.011
45	−0.007	−0.006	105	+0.003	+0.005	165	+0.010	+0.011
50	−0.006	−0.005	110	+0.003	+0.005	170	+0.010	+0.011
55	−0.006	−0.005	115	+0.004	+0.006	175	+0.010	+0.011
P	ΔP Fk.	ΔP Hd.	P	ΔP Fk.	ΔP Hd.	P	ΔP Fk.	ΔP Hd.
°	°	°	°	°	°	°	°	°
180	+0.010	+0.011	240	+0.005	+0.004	300	−0.005	−0.007
185	+0.010	+0.011	245	+0.004	+0.003	305	−0.006	−0.008
190	+0.010	+0.010	250	+0.003	+0.002	310	−0.006	−0.008
195	+0.010	+0.010	255	+0.003	+0.001	315	−0.007	−0.009
200	+0.010	+0.010	260	+0.002	0.000	320	−0.008	−0.010
205	+0.009	+0.009	265	+0.001	−0.001	325	−0.008	−0.010
210	+0.009	+0.008	270	0.000	−0.002	330	−0.009	−0.010
215	+0.008	+0.008	275	−0.001	−0.003	335	−0.009	−0.011
220	+0.008	+0.007	280	−0.002	−0.004	340	−0.009	−0.011
225	+0.007	+0.006	285	−0.003	−0.005	345	−0.010	−0.011
230	+0.006	+0.005	290	−0.003	−0.005	350	−0.010	−0.011
235	+0.006	+0.005	295	−0.004	−0.006	355	−0.010	−0.011

The eyepieces.—There are two sets of negative eyepieces which fit into the draw tube of the telescope when the micrometer is removed. One set consists of four eyepieces of the AIRY pattern, made by ALVAN CLARK and Sons at the time the original mounting was constructed. The other set is composed of nine eyepieces of the AIRY-HUYGENIAN type and one HERSCHEL solar prism, all made by M. E. KAHLER. Their magnifying powers are approximately as follows:

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Set 1. Negative Eyepieces.

Designation.	Magnifying Power.	Field of View.	Makers.
	Diameters.	′	
A_I	155	25.2	Clark and Sons.
A_{II}	439	10.5	"
A_{III}	863	3.5	"
A_{IIII}	1,360	2.5	"

Taken from the Washington Observations for 1874, Vol. XXI, Appendix I.

Set 2. Negative Eyepieces.

Designation.	Magnifying Power.	Field of View.	Makers.
	Diameters.	′	
I	98	33.1	Kahler.
II	138	25.6	"
III	195	17.6	"
IV	276	12.8	"
V	390	8.8	"
VI	551	5.3	"
VII	780	4.4	"
VIII	1,103	2.6	"
IX	1,560	1.3	"

From a manuscript by Prof. WM. HARKNESS.

The positive eyepieces are as follows:

Positive Eyepieces.

Designation.	Magnifying Power.	Field of View	Makers.	Remarks.
	Diameters.	′		
1	173	13.2	Clark and Sons.	
1 A	178	12.0		
2	252	9.3		
2 A	284	8.1	Kahler.	
3	392	9.9	Clark and Sons.	
3 A	375	6.6	Kahler.	Achromatic.
3 B	388	6.5		
3 C	360	7.8	Kahler.	
5 A	525	4.2	Kahler.	Achromatic.
6 A	888	2.3	Steinheil.	Achromatic.
7 C	761	3.2	Kahler.	Crown glass.
8 C	771	3.0		
8 F	875	3.2	Kahler.	Flint glass.
9	1,103	2.6	Kahler.	
10	1,282	2.1	Kahler.	
11	1,802	1.6	Kahler.	
I	390	4.9	Kahler.	Single lens.
II	585	3.2	Kahler.	Single lens.
III	780	2.6	Kahler.	Single lens.
IV	1,560	1.8	Kahler.	Single lens.

The magnifying powers of 1, 2 A, 3, 6 A, 7 C, 8 F, 9, 10, 11, I, II, III, and IV are the same as given in the Washington Observations for 1874, Volume XXI, Appendix I. The others have been determined recently with the RAMSDEN dynameter made for use with the telescope by EDWARD KAHLER.

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The chronographs.—Until October, 1897, one of the transit-of-Venus chronographs was used in connection with this instrument. After this date, the CLARK chronograph, properly belonging to the instrument and described in the Washington Observations for 1874, Volume XXI, Appendix I, page 41, was used. It had been necessary to lessen the fall of the driving weights of the CLARK chronograph from 106 to 36 inches.

The chronograph has always been connected with a NEGUS break-circuit sidereal chronometer, the correction to which has been determined by direct comparison with one of the standard clocks.

The instrumental constants.—Two determinations of ξ and η, the coordinates of the polar axis, were made by Professor BROWN.

The coordinate ξ was determined on one night and the coordinate η on four nights by Professor SEE. He also derived from his observations a value of e, the flexure of the telescope tube, and of i_1, the inclination of the axes, using in his determination of i_1, the value of the collimation which he obtained by the aid of a small collimator. His results are printed in Publications of the United States Naval Observatory, Second Series, Volume III, Part I. His published value of i_1 is erroneous, due to the omission in his reductions of a term depending on the flexure of the declination axis. The latter quantity amounts to about 122″, and is not negligible.

In 1902 and 1903 a thorough investigation of the constants of this instrument was made by Assistant C. W. FREDERICK, and his results, with the method of obtaining the same, are printed in Publications of the United States Naval Observatory, Second Series, Volume IV, Appendix III. Tables constructed by Mr. FREDERICK for correcting observations for the effect of the instrumental constants are also given in the above-mentioned publication.

Subsequent determinations of these constants have been made by Mr. HAMMOND, and the results of all the determinations are collected in the following table, using the notation adopted by Mr. FREDERICK.

η = the distance of the instrumental pole westward from the true pole, measured along the six-hour circle.

ξ = the distance of the instrumental pole above the true pole, measured along the meridian.

i_1 = the inclination of the axes. The angle between the polar axis produced northward and the declination axis produced through the telescope tube is $i_1 + 90°$. This is the observed angle as affected by the flexure of the declination axis.

c = the collimation. The angle between the optical axis of the telescope produced through the objective and the declination axis produced through the tube is $c + 90°$.

ε = the maximum flexure of the declination axis, positive when the end joining the tube bends downward.

e = the maximum flexure of the telescope tube, positive when the objective end of the tube bends the more.

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Summary of Determinations of the Instrumental Constants of the 26-inch Equatorial.

Date.	Obs'r.	Temp.	η	$i_1 - c$	ξ	c		$\epsilon \cos \varphi$	$e \cos \varphi$ from Stars.	e from Coll's.
						From Stars.	From Coll's.			
1898		°	″	″	″	″	″	″	″	″
Nov. 27	Br.	..	+104	..	−76	...	...	...	...	..
1899										
Apr. 5	Br.	..	+ 87	..	−64	...	...	...	...	..
1901										
Feb. 6	See	..	...	..	−68	...	...	...	−1.3	..
27	See	..	+113	..	..	...	...	...	...	..
May 4	See	..	+112	..	..	...	...	...	...	..
13	See	..	+119	..	..	...	+118*	...	...	..
14	See	..	+116	..	..	...	+116*	...	...	..
1902										
July 13	Fk.	69 F	+116	−54	−71	...	...	...	...	...
27	Fk.	76	+113	−55	−73	...	...	...	...	..
Aug. 3	Fk.	80	+115	−51	−73	...	...	...	...	..
11	Fk.	70	+115	−55	−75	...	...	...	...	..
28	Fk.	67	+121	−55	−74	...	...	...	...	..
Sept. 23	Fk.	70	+115	−52	−73	...	+113	...	...	..
Oct. 22	Fk.	51	+116	−52	−73	+114	...	+ 94	...	..
27	Fk.	64	...	..	..	...	+113	...	...	+10
Nov. 5	Fk.	56	...	..	..	...	...	...	...	+ 4
28	Fk.	35	+116	−52	−68	+107	+108	...	...	..
1903										
Jan. 9	Fk.	27	...	..	..	+113	+119	+ 96	+ 2	− 2
9	Fk.	20	+114	−57	−67	...	...	...	...	..
Feb. 17	Fk.	14	+111	−56	−63	+115	...	+ 95	+ 4	..
Mar. 13	Fk.	55	+114	−50	−70	...	...	...	...	..
Apr. 21	Fk.	48	+113	−55	−65	+113	...	+ 98	+ 6	..
June 21	Fk.	70	+113	−53	−74	+114	...	+ 96	+ 5	..
Oct. 13	Fk.	60	+114	−55	−72	...	...	...	...	..
1904										
Feb. 3	Fk.	24	+113	−57	−61	...	...	...	...	..
May 7	Fk.	65	+115	−53	−72	+111	...	+ 92	+ 7	..
Oct. 9	Hd.	66	+115	−52	−63	...	...	...	...	..
1905										
May 20	Hd.	57	+111	−54	−61	...	...	...	...	..
June 5	Hd.	76	+111	−55	−62	+116	...	+104	+ 4	..
Nov. 11	Hd.	43	+112	−53	−65	+112	...	+ 93	+ 5	..

* Determined on May 20 and May 21, 1901, respectively.

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The torsion of the telescope tube, f, was determined by Mr. FREDERICK from levels placed on the micrometer box, with the following results:

Date.	Temp.	f	Date.	Temp.	f	Date.	Temp.	f
1903	°	°	1903	°	°	1903	°	°
May 5	..	+0.021	July 13	74 F	+0.022	July 24	72 F	+0.017
26	64 F	+0.023	13	75	+0.013	1904		
June 25	70	+0.017	24	72	+0.014	May 8	65	+0.020
26	68	+0.016				8	65	+0.015

These results show no appreciable change in the constants due to changes of temperature. The values adopted by Mr. FREDERICK for the computation of his tables are:

$$\eta = +115''$$
$$\xi = -\ 72$$
$$c = +113$$
$$i_1 = +\ 59$$
$$e \cos \varphi = +\ 5$$

$$f = +0^{\circ}.018$$

By means of these tables all observations made after January 1, 1902, have been corrected for the effect of the constants. Prior to 1902 no such corrections have been applied to the observations printed in this volume.

II. THE 12-INCH EQUATORIAL.

The objective.—The 9.6-inch objective which was used with this instrument until December 19, 1895, was made by MERZ & MAHLER, of Munich. Its aperture and focal length, as given in the Washington Astronomical Observations for 1874, Volume XXI, Appendix I, are respectively 9.62 inches and 14 feet 4.5 inches.

The 12-inch objective which has been in use since the above date, was made by ALVAN CLARK and Sons. It is of the FRAUNHOFER-HERSHEL form and its curves were specially computed by Prof. WILLIAM HARKNESS, U. S. N., from the refractive indices of the hard crown and dense flint glasses of which its lenses were made. Its clear aperture is 11.98 inches, and the distance from the front surface of the crown lens to the focal plane is 180.6 inches.

The column.—The column is of cast-iron and its base, which measures 6 feet 6 inches on the north and south line by 5 feet on the east and west, is rigidly bolted to the masonry pier. It rises to a height of 10 feet above the cap-stone and 8 feet above the floor of the observing room. It is circular in section except at the top and bottom and tapers slightly from the base upward, the diameter of a section in the center being about 16 inches. The top of the column which supports the head is 18 inches square.

There are two glass doors, one on the east and one on the west side of the column, for access to the driving clock which is located within the section. Another opening on the east side near the floor affords access to the weights of the driving clock.

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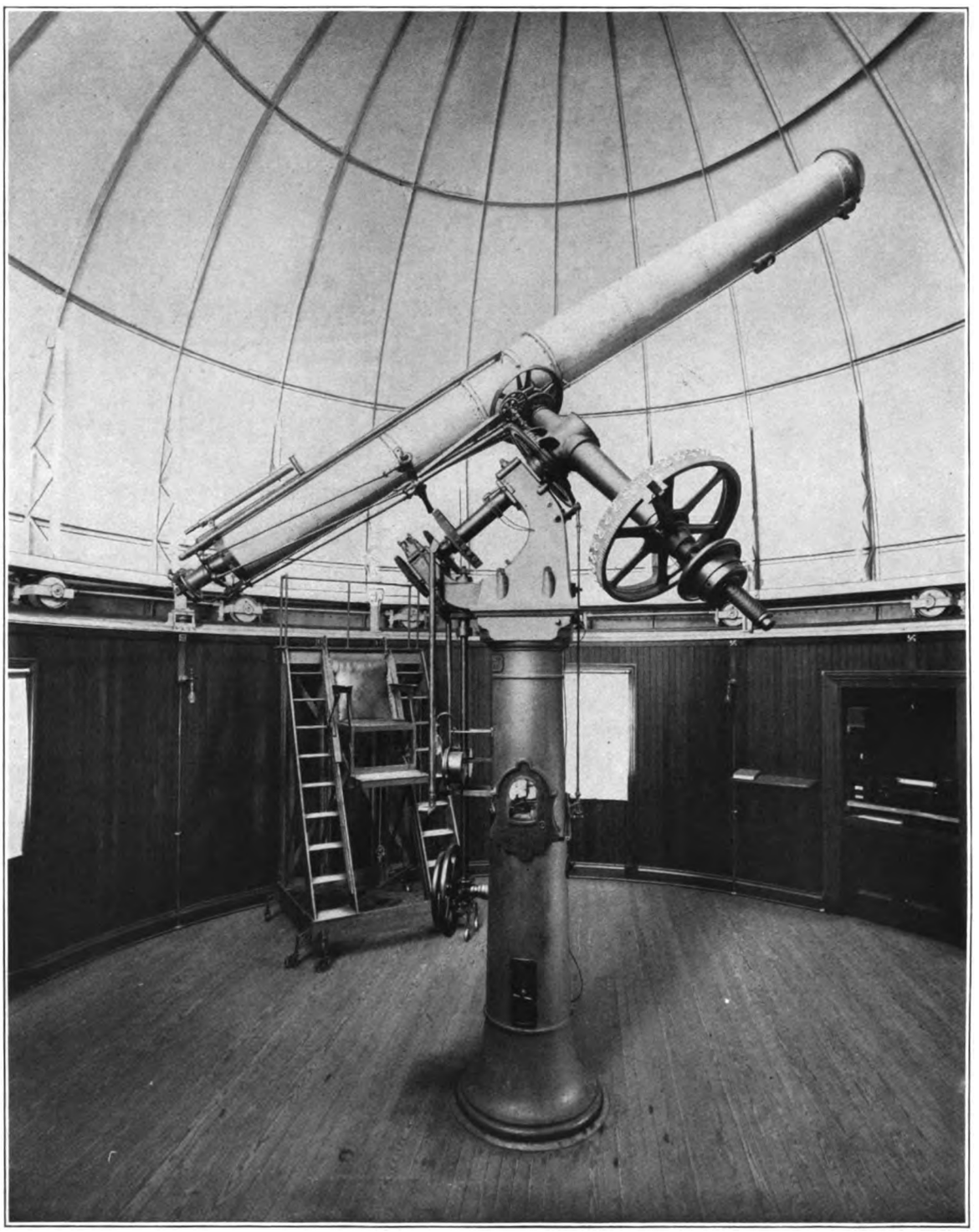

THE 12-INCH EQUATORIAL.

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The equatorial head.—The equatorial head consists of a single casting of great solidity carrying the polar axis and its attachments. It is provided with means for adjustments in altitude and azimuth.

The axes.—The polar and declination axes are of hand-forged steel, with the friction in the bearings and the end thrust relieved by antifriction mechanism.

The tube.—The tube is made up of eight sections of hard rolled sheet steel, except the central section, which is of cast steel, for attachment to the declination axis. These sections are solidly riveted together, and the tube has a taper each way from the center. The diameter of the tube is 15 inches at the center and 12 inches at the ends. Its length, not including the draw tube, is 14 feet.

During the fiscal year ending June 30, 1897, the diaphragms in the tube were replaced by ones of larger aperture to prevent cutting off the outer edge of the field of view of the low power HUYGENIAN eyepieces.

The circles.—The fine reading circles in hour angle and declination are graduated on silver to 30^s and 5′, respectively. The least readings of the verniers are 1^s in hour angle and 10″ in declination.

The hour circle is read by two microscopes, located on the south side of the column at a convenient height above the floor. The declination circle is read at the eye-end by means of two microscopes attached to the tube. In December, 1896, new objectives were placed in these microscopes by M. E. KAHLER, as the old ones gave very bad definition on account of excessive spherical aberration.

The instrument also has coarse circles in both hour angle and declination and a dial which indicates directly the setting in right ascension and declination.

The finder.—The finder is attached to the side of the tube opposite the declination axis. The one, used at first with this instrument, was taken from the 9.6-inch equatorial. It has an aperture of 2.6 inches and a focal length of 32 inches, and carries an eyepiece magnifying 20 diameters.

This was replaced in August, 1905, by one made by JOHN CLACEY, of Glendale, Maryland, which has an aperture of 4$\frac{1}{16}$ inches and a focal length of 46½ inches. It has an eyepiece, magnifying 35 diameters and a field of view of 1° 30′

A direct vision spectroscope is also provided for the instrument.

The driving clock.—The driving clock, which is located within the cast-iron column, has a double conical pendulum and is driven by a weight which is wound up by hand. The motion of the clock is communicated to the polar axis by a continuous worm gear. Extra gears are provided for changing from a sidereal to a mean solar or a mean lunar rate.

The clock is entirely too small to control a telescope of this size. A new and slightly heavier pendulum was made for it in 1904 by Mr. DINWIDDIE. This improved the driving of the clock, but it is still unsatisfactory.

Other details.—The clamps and slow motions in right ascension and declination are operated from the eye-end of the telescope and are on the same side of the tube as the declination axis.

Rapid motion is given to the telescope by means of two hand wheels located on the south side of the column and connected by gearing with the axes of the instrument.

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The building and pier.—The equatorial is located in the west end of the main building, as shown by PLATE IX. The masonry pier which supports the instrument is constructed of hard pressed brick and rests on a solid concrete foundation 20 feet square. From the concrete foundation, which is about 4 feet below the basement floor to the level of the first floor, the pier is in the form of a frustum of a pyramid. The base of the frustum is 13 feet 8 inches square and the top is 11 feet 6 inches square. From the first floor to the top the pier has the form of a frustum of a cone, the diameter of the base being 10 feet and the top 9 feet. The total height of the pier above the concrete foundation is 58 feet 9 inches and above the ground 46 feet 6 inches. It is hollow from the basement floor to a point about 4 feet from the top.

The pier is 172 feet south and 276 feet east of the center of the clock room, which determines the latitude and longitude of this observatory.

The dome.—The steel dome was made by The WARNER and SWASEY Company, and is similar in construction to the large dome for the 26-inch equatorial. It is 26 feet in diameter with a slit 3 feet wide running from the base to a point a little beyond the zenith. The clear aperture of the slit when the shutters are opened to the widest extent is 2 feet 7 inches, which is too narrow an opening for an instrument of this size.

There are 14 sets of wheels, 3 in each set, which carry the dome on the circular track. These sets of wheels are equally spaced about the track and are rigidly connected by rods. The diameter of the inner wheels is 10 inches. The dome is turned by a hand rope.

Cork paint has been applied to the inner surface of the dome to prevent moisture condensing on it and dripping on the instrument and floor.

Illumination of the instrument.—A 110-volt commercial lighting circuit is used for illuminating the circles and the micrometer. A set of contact springs on the polar axis and another on the declination axis serve to convey the current from the column to the eye-end of the instrument. A third set of springs on the micrometer carries the current to the lamps of the micrometer. All the lamps on the instrument are 20-volt and 2 candle-power. The two which illuminate the hour circle are in series and are controlled by a switch on the south side of the column. The two which illuminate the declination circle and the two which illuminate the micrometer threads are in series by pairs on separate circuits and controlled by a two-point switch on the telescope tube at the eye-end.

There is no arrangement for bright field illumination for this instrument.

The micrometer.—The micrometer was made by G. N. SAEGMÜLLER, formerly of Washington, D. C. It has five fixed longitudinal threads for measuring differences in right ascension by transits. These threads are 0.12 inch apart, corresponding to an equatorial interval of about $9^s.1$ for the 12-inch objective and $9^s.5$ for the 9.6-inch.

At right angles to this set of threads is a fixed transverse thread and five movable threads carried on a slide attached to the micrometer screw. If the latter threads be designated as I, II, III, IV, and V in order from the head of the screw, then the

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THE MAIN BUILDING AND DOME OF THE 12-INCH EQUATORIAL.

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approximate distances between them and the corresponding intervals for the two objectives are as follows:

Threads.	Distance.	Interval.	
		12-inch.	9.6-inch.
	in	"	"
I–II	0.18	206	215
II–III	0.24	276	289
III–IV	0.24	276	289
IV–V	0.18	206	215

The illumination of the threads is at present effected by two small 20-volt and 2 candle-power lamps, one lamp for each set of threads. The intensity of the illumination can be varied by changing the width of the slit through which the light is admitted.

The micrometer screw was investigated for progressive and periodic errors by Assistant MATT FREDERICKSON in June, 1908. This investigation was made with the Ruled Glass Scale Comparator, and in this case each quarter revolution of the micrometer screw was measured with the same part of the screw A of the comparator. The results are given in TABLES X, XI. One revolution of Micrometer A corresponds to 1".056.

TABLE X.—*Showing Inequalities in the Whole Revolutions.*

Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.	Micrometer		Residuals from Mean.
Saegmüller.	A.		Saegmüller.	A.		Saegmüller.	A.		Saegmüller.	A.	
rev.	rev.	"	rev.	rev.	"	rev.	rev.	"	rev.	rev.	"
5– 6	21.635	+0.039	15–16	21.658	+0.015	25–26	21.692	−0.021	35–36	21.690	−0.019
6– 7	21.642	+0.032	16–17	21.672	0.000	26–27	21.687	−0.016	36–37	21.688	−0.017
7– 8	21.656	+0.017	17–18	21.650	+0.023	27–28	21.682	−0.011	37–38	21.685	−0.014
8– 9	21.653	+0.020	18–19	21.665	+0.007	28–29	21.664	+0.008	38–39	21.702	−0.032
9–10	21.628	+0.046	19–20	21.660	+0.013	29–30	21.672	0.000	39–40	21.698	−0.027
10–11	21.645	+0.028	20–21	21.681	−0.010	30–31	21.666	+0.006	40–41	21.695	−0.024
11–12	21.664	+0.008	21–22	21.668	+0.004	31–32	21.677	−0.005	41–42	21.688	−0.017
12–13	21.658	+0.015	22–23	21.669	+0.003	32–33	21.678	−0.006	42–43	21.683	−0.012
13–14	21.665	+0.007	23–24	21.645	+0.028	33–34	21.680	−0.008	43–44	21.692	−0.021
14–15	21.660	+0.013	24–25	21.675	−0.003	34–35	21.697	−0.026	44–45	21.705	−0.035

The excess of positive residuals in the first part of the screw and of negative residuals in the last part indicates either a small progressive error in the screw of this micrometer or a slight change in the comparator during the course of the investigation. If any progressive error exists in the micrometer screw, it is too small to affect appreciably any measurements made with it.

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TABLE XI.—*Showing the Inequalities in the Quarter Revolutions.*

Saeg-müller Microm.	First Quarter.	Second Quarter.	Third Quarter.	Fourth. Quarter.	Residuals from Mean.			
					First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.
rev.	rev.	rev.	rev.	rev.	″	″	″	″
5– 6	5.415	5.388	5.425	5.396	−0.010	+0.019	−0.020	+0.011
6– 7	5.430	5.396	5.405	5.401	−0.025	+0.011	+0.001	+0.005
7– 8	5.392	5.379	5.422	5.377	+0.014	+0.028	−0.017	+0.031
8– 9	5.400	5.374	5.384	5.389	+0.006	+0.034	+0.023	+0.018
9–10	5.370	5.353	5.435	5.408	+0.038	+0.056	−0.031	−0.002
10–11	5.378	5.364	5.467	5.419	+0.030	+0.044	−0.064	−0.014
11–12	5.380	5.386	5.423	5.410	+0.027	+0.021	−0.018	−0.004
12–13	5.418	5.384	5.430	5.384	−0.013	+0.023	−0.025	+0.023
13–14	5.370	5.365	5.438	5.365	+0.038	+0.043	−0.034	+0.043
14–15	5.361	5.378	5.408	5.435	+0.047	+0.030	−0.002	−0.031
15–16	5.404	5.384	5.435	5.398	+0.002	+0.023	−0.031	+0.008
16–17	5.383	5.405	5.406	5.410	+0.024	+0.001	0.000	−0.004
17–18	5.406	5.392	5.413	5.431	0.000	+0.015	−0.007	−0.026
18–19	5.400	5.390	5.418	5.387	+0.006	+0.017	−0.013	+0.020
19–20	5.435	5.371	5.420	5.398	−0.031	+0.037	−0.015	+0.008
20–21	5.408	5.385	5.408	5.388	−0.002	+0.022	−0.002	+0.019
21–22	5.426	5.391	5.406	5.400	−0.021	+0.016	0.000	+0.006
22–23	5.415	5.378	5.414	5.426	−0.010	+0.030	−0.008	−0.021
23–24	5.413	5.393	5.433	5.405	−0.007	+0.014	−0.028	+0.001
24–25	5.410	5.403	5.403	5.417	−0.004	+0.003	+0.003	−0.012
25–26	5.400	5.409	5.403	5.422	+0.006	−0.003	+0.003	−0.017
26–27	5.411	5.406	5.418	5.425	−0.005	0.000	−0.013	−0.020
27–28	5.393	5.379	5.435	5.427	+0.014	+0.028	−0.031	−0.022
28–29	5.417	5.371	5.436	5.418	−0.012	+0.037	−0.032	−0.013
29–30	5.410	5.385	5.438	5.418	−0.004	+0.022	−0.034	−0.013
30–31	5.424	5.381	5.414	5.409	−0.019	+0.026	−0.008	−0.003
31–32	5.407	5.404	5.423	5.410	−0.001	+0.002	−0.018	−0.004
32–33	5.408	5.396	5.427	5.406	−0.002	+0.011	−0.022	0.000
33–34	5.406	5.410	5.430	5.408	0.000	−0.004	−0.025	−0.002
34–35	5.399	5.392	5.402	5.430	+0.007	+0.015	+0.004	−0.025
35–36	5.410	5.410	5.411	5.415	−0.004	−0.004	−0.005	−0.009
36–37	5.418	5.401	5.415	5.418	−0.013	+0.005	−0.010	−0.013
37–38	5.427	5.380	5.424	5.401	−0.022	+0.027	−0.019	+0.005
38–39	5.427	5.398	5.424	5.428	−0.022	+0.008	−0.019	−0.023
39–40	5.414	5.388	5.430	5.411	−0.008	+0.019	−0.025	−0.005
40–41	5.405	5.401	5.421	5.408	+0.001	+0.005	−0.016	−0.002
41–42	5.410	5.395	5.423	5.405	−0.004	+0.012	−0.018	+0.001
42–43	5.406	5.383	5.432	5.401	0.000	+0.024	−0.027	+0.005
43–44	5.404	5.388	5.420	5.429	+0.002	+0.019	−0.015	−0.024
44–45	5.397	5.400	5.450	5.402	+0.009	+0.006	−0.046	+0.004

The mean of the residuals for the first quarter is ..... +0″.0008
The mean of the residuals for the second quarter is ..... +0″.0185
The mean of the residuals for the third quarter is..... −0″.0165
The mean of the residuals for the fourth quarter is..... −0″.0025

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This gives as the formula for periodic errors:

$$\varphi(u) = -0''.0096 \cos u - 0''.0009 \sin u + 0''.0040 \cos 2u.$$

The periodic errors, as well as the progressive errors, are small, and the screw is an excellent one in every respect.

This micrometer screw has 50 threads to the inch. There have been several determinations of the value of one revolution, and the different values adopted and used in the reduction of the observations published in this volume are as follows:

Period for which adopted.	Value of One Revolution.	Observer.	Objective.	Remarks.
	"			
From Oct. 10, 1894, to Dec. 3, 1895	23.872	F.	9.6-inch	From transits of circumpolar stars.
From Feb. 21, 1896, to Apr. 17, 1899.	22.7714	F.	12-inch	From transits of circumpolar stars.
From July 17, 1899, to Oct. 29, 1900.	22.8876	See	12-inch	From differences of declinations of stars in the Pleiades and from transits of circumpolar stars.
From Apr. 27, 1901, to Dec. 31, 1907.	22.8944	See and Hd.	12-inch	A mean of See's previous value and a value by Hammond from transits of circumpolar and equatorial stars.

The position circle.—The position circle, by Saegmüller, is 7¼ inches in diameter, and is graduated to half degrees. It is read by two verniers, designated by A and B, the least reading being 0°.02.

The following readings of the two verniers for the eccentricity of the position circle were made by J. C. Hammond in June, 1908:

Vernier A.	Vernier B.	A–B +180°	Vernier A.	Vernier B.	A–B +180°	Vernier A.	Vernier B.	A–B +180°	Vernier A.	Vernier B.	A–B +180°
°	°	°	°	°	°	°	°	°	°	°	°
0.00	179.96	+0.04	90.00	269.98	+0.02	180.00	0.00	0.00	270.00	90.01	−0.01
5.00	184.96	+0.04	95.00	274.99	+0.01	185.00	5.00	0.00	275.00	95.01	−0.01
10.00	189.96	+0.04	100.00	279.98	+0.02	190.00	10.00	0.00	280.00	100.01	−0.01
15.00	194.97	+0.03	105.00	284.98	+0.02	195.00	15.00	0.00	285.00	105.01	−0.01
20.00	199.95	+0.05	110.00	289.99	+0.01	200.00	20.00	0.00	290.00	110.01	−0.01
25.00	204.96	+0.04	115.00	295.00	0.00	205.00	25.00	0.00	295.00	115.00	0.00
30.00	209.95	+0.05	120.00	299.98	+0.02	210.00	30.00	0.00	300.00	120.01	−0.01
35.00	214.96	+0.04	125.00	305.00	0.00	215.00	35.00	0.00	305.00	125.00	0.00
40.00	219.97	+0.03	130.00	310.00	0.00	220.00	40.00	0.00	310.00	130.00	0.00
45.00	224.97	+0.03	135.00	314.99	+0.01	225.00	45.00	0.00	315.00	135.00	0.00
50.00	229.97	+0.03	140.00	319.99	+0.01	230.00	50.00	0.00	320.00	140.00	0.00
55.00	234.97	+0.03	145.00	325.00	0.00	235.00	55.01	−0.01	325.00	144.99	+0.01
60.00	239.97	+0.03	150.00	330.00	0.00	240.00	60.01	−0.01	330.00	149.98	+0.02
65.00	244.98	+0.02	155.00	335.00	0.00	245.00	65.01	−0.01	335.00	154.98	+0.02
70.00	249.98	+0.02	160.00	340.00	0.00	250.00	70.02	−0.02	340.00	159.98	+0.02
75.00	254.99	+0.01	165.00	345.00	0.00	255.00	75.02	−0.02	345.00	164.97	+0.03
80.00	259.99	+0.01	170.00	350.00	0.00	260.00	80.01	−0.01	350.00	169.97	+0.03
85.00	264.98	+0.02	175.00	355.01	−0.01	265.00	85.01	−0.01	355.00	174.96	+0.04

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If P is the reading of either vernier, then the correction for eccentricity as determined from these readings is

$$\Delta P = +0°.010 \sin (P + 229°.3).$$

No correction for eccentricity has been applied to the measurements of position angles made with this micrometer, but Assistant Astronomer THEO I. KING, in his observations of the satellites of Jupiter, made a practice of reading both verniers and taking the mean, thus eliminating the effect of eccentricity.

The eyepieces.—There are two sets of eyepieces. One set consists of 9 negative eyepieces of the AIRY-HUYGENIAN type and one HERSCHEL solar prism. The other set consists of 6 positive eyepieces of the KELLNER form.

The magnifying powers of these eyepieces as determined with the RAMSDEN dynameter and the fields of view are as follows:

Negative Eyepieces.

Designation.	Magnifying Power.	Field of View.	Maker.
	Diameters.	′	
I	37	66	Kahler.
II	50	50	"
III	85	33	"
IV	118	26.5	"
V	196	15.6	"
VI	258	9.2	"
VII	314	6.8	"
VIII	571	4.5	"
IX	790	3.0	"

Positive Eyepieces.

Designation.	Magnifying Power.	Field of View.	Maker.
	Diameters.	′	
I	115	21.0	Kahler.
II	160	16.0	"
III	235	12.4	"
IV	335	8.0	"
V	500	6.1	"
VI	705	4.7	"

The chronograph.—A chronograph regulated by a HIPP spring governor has been used continuously with this instrument in connection with a NEGUS break-circuit sidereal chronometer. The correction to the chronometer has been obtained by direct comparison with one of the standard clocks.

The instrumental constants.—The instrumental constants have been determined as follows:

Date.	Obs'r.	Temp.	η	$i_1 - c$	ξ	c from Stars.	$\varepsilon \cos \varphi$	$e \cos \varphi$ from Stars.
1903		°	″	″	″	″	″	″
Jan. 19	K.	21F	+25	−72	+54	...	...	..
Dec. 6	Hd.	30	+29	−83	+63	+102	+136	+12
1904								
Jan. 27	Hd.	21	+28	−87	+82	+107	+138	+ 8
Apr. 4	Hd.	40	+27	−83	+68	...	...	..

No corrections have been applied to the observations for the effect of these constants.

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THE 5-INCH COMET SEEKER.

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COMET SEEKERS.

There are two comet seekers. A description of one is contained in the Washington Astronomical Observations for 1874, Volume XXI, Appendix I, page 20. It was made by UTZSCHNEIDER & FRAUENHOFER, is equatorially mounted, and has an objective of 3.96 inches aperture and 32.4 inches focal length. It has five eyepieces, whose magnifying powers are approximately 13.6, 19.4, 40.6, 40.8, and 41.6. The last eyepiece is furnished with a ring micrometer.

The other comet seeker (see Plate X), made by JOHN A. BRASHEAR Co., of Allegheny, Pa., has an objective of 5 inches aperture and 40 inches focal length. It has an alt-azimuth mounting and the observer looks through the horizontal axis. It has five HUYGENIAN eyepieces whose magnifying powers are approximately 20, 28, 40, 57, and 80.

When these instruments are used they are placed on stands on the roof of the main building.

OBSERVATIONS AND REDUCTIONS.

The observations have been arranged in eight general classes as follows:

I. OBSERVATIONS OF SATELLITES.
II. MEASURES OF DIAMETERS OF PLANETS AND SATELLITES.
III. OBSERVATIONS OF DOUBLE STARS.
IV. OBSERVATIONS OF MINOR PLANETS AND COMETS.
V. OBSERVATIONS OF OCCULTATIONS OF STARS BY THE MOON.
VI. OBSERVATIONS OF PHENOMENA OF SATELLITES OF JUPITER AND SATURN.
VII. OBSERVATIONS OF MISCELLANEOUS STARS.
VIII. OBSERVATIONS OF TRANSITS OF MERCURY.

The observations of each object are printed in chronological order.

I. OBSERVATIONS OF SATELLITES.

The satellites are arranged in order of their distances from the Sun, beginning with the satellites of Mars and ending with the satellite of Neptune.

The satellites of Mars.—The satellites of Mars have been observed at five oppositions, as is shown in the following table. The number of observations of each satellite at any opposition is given by the number opposite that satellite in the corresponding column.

Opposition. / Satellite.	1894	1896	1903	1905	1907
Phobos	35	7	2	0	14
Deimos	31	24	1	2	12

In 1907 the satellites were observed in rectangular coordinates by measuring from the limbs of the planet. At the other oppositions, the measures were made in position angle and distance from the estimated center of the illuminated disk of Mars. Corrections have been applied in all cases for differential refraction and for defective illumination. When the measures were made in position angle and distance

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from the center of the illuminated disk of the planet, the corrections for defective illumination were computed from the formulæ

$$\Delta s = -\frac{4q}{3\pi}\cos(p-Q),$$

$$s \sin \Delta p = +\frac{4q}{3\pi}\sin(p-Q).$$

In these expressions p and s are the observed position angle and distance, respectively; Q is the position angle and q the amount of the greatest defect of illumination; π is the constant 3.1416. The quantities Q and q were taken from MARTH'S Ephemerides for Physical Observations of Mars, published in the Monthly Notices.

If we denote by R_1 and R_2 the measured distances of the satellite from the limbs of the planet in either rectangular coordinate x or y, then the true distance of the satellite from the center of the planet corrected for defective illumination is

$$x, y = \frac{R_1 + R_2}{2} \pm \frac{a(f-0.500)}{f},$$

where a is the semi-diameter of the planet as above and f is a tabular quantity corresponding to the coordinate x, y and taken from TABLE XXV of the Reduction Tables for Transit Circle Observations, Publications of the United States Naval Observatory, Second Series, Volume IV, Appendix II. The proper sign for the correction

$$\frac{a(f-0.500)}{f},$$

is best determined in each case by reference to a rough diagram.

Beginning with 1903, corrections have also been applied for instrumental constants.

A discussion of the observations in 1894 and 1896 by Prof. S. J. BROWN, U. S. N., is published in the Astronomical Journal, No. 467.

The satellites of Jupiter.—The four bright satellites of Jupiter were observed in pairs, while Satellite VI was observed by determining the differences in right ascension and declination between it and some near reference star. The oppositions at which they were observed and the number of observations at each opposition are as follows:

Opposition. / Satellites.	1902	1903-04	1904-05	1905-06
I-II	5	39	37	19
I-III	4	28	40	22
I-IV	3	17	0	0
II-III	4	26	36	24
II-IV	1	23	0	0
III-IV	3	17	37	20
VI	0	0	0	8

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The measured position angles and distances of the pairs have been corrected for differential refraction.

The observed values of $\Delta\alpha$ and $\Delta\delta$ for Satellite VI have been corrected for differential refraction and for instrumental constants.

Satellite VII is not visible with the 26-inch equatorial.

The satellites of Saturn.—The satellites of Saturn have always been observed in pairs with the single exception of Hyperion, which in 1895 was measured directly with the planet. The following table shows the different combinations which were observed, as well as the oppositions and number of observations at each opposition:

Satellites. \ Opposition.	1894	1895	1896	1898	1900	1901	1902	1903	1904	1905	1906	1907
Mimas–Enceladus	0	0	0	0	0	0	0	0	5	8	5	0
Mimas–Tethys	0	0	0	0	0	23	37	3	10	4	5	10
Mimas–Dione	0	0	0	0	0	1	0	0	3	5	0	0
Mimas–Rhea	0	0	0	0	0	0	0	0	4	4	0	9
Enceladus–Tethys	0	0	0	0	0	53	53	32	31	20	14	18
Tethys–Dione	0	24	20	0	48	66	59	36	39	32	13	28
Tethys–Rhea	0	0	0	0	0	0	24	52	43	35	16	26
Tethys–Titan	0	0	0	0	0	0	24	45	0	0	0	0
Tethys–Hyperion	0	0	0	0	0	0	0	6	0	0	0	0
Tethys–Japetus	0	0	0	0	0	0	22	18	15	0	0	0
Dione–Rhea	0	0	0	0	0	0	25	28	24	36	13	25
Rhea–Titan	21	0	0	0	59	66	58	47	37	39	14	24
Rhea–Japetus	0	23	0	35	0	0	0	0	0	0	0	0
Titan–Hyperion	0	0	0	0	2	32	31	15	13	19	6	18
Hyperion	0	5	0	0	0	0	0	0	0	0	0	0
Titan–Japetus	26	25	24	0	0	55	49	43	32	40	20	32

The pairs were usually observed in position angle and distance, the position angle being taken in every case about the inner satellite of the pair. When, however, the two satellites of any pair were widely separated, they were sometimes observed by determining the differences in right ascension and declination between them by the method of transits. In the latter case, the time of transit of the inner satellite of the pair was taken as the time of the observation, and the differences in α and δ were corrected for the motion of the planet in the interval between the transits.

In all cases the observations have been corrected for differential refraction and, beginning with the year 1903, corrections have been applied for instrumental constants.

Phœbe, the ninth satellite of Saturn, has been searched for on several occasions but unsuccessfully.

The observations of Titan–Japetus in 1894, 1895, and 1896 have been discussed by Prof. S. J. Brown, U. S. N., in the Astronomical Journal, No. 443.

The satellites of Uranus.—The inner satellites of Uranus, Ariel, and Umbriel are extremely difficult objects to observe when the planet is at such low altitudes as it

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has been during the time covered by these observations. They have been seen only on rare occasions and no attempt has been made to secure a series of observations of them except in 1901.

The outer satellites are fairly easy objects to observe with the 26-inch objective. They have been observed directly with Uranus and also with each other, as shown by the following table:

Satellites. \ Opposition.	1900	1901	1902	1903	1904	1905	1906	1907
Ariel	0	18	0	0	0	0	0	0
Umbriel	0	18	0	0	0	0	0	0
Titania	34	40	46	10	20	7	3	23
Oberon	33	39	41	6	0	0	3	0
Titania–Oberon	0	39	42	10	15	7	0	23

All measures have been made in position angle and distance, and corrections have been applied throughout for differential refraction and, from 1903 to 1907 inclusive, for instrumental constants.

The satellite of Neptune.—The following table gives the oppositions at which the satellite of Neptune has been observed and the number of observations at each opposition:

Satellite. \ Opposition.	1894–95	1896–97	1897–98	1899–1900	1902–03	1903–04	1904–05	1905–06
Satellite of Neptune	13	1	40	64	22	8	17	30

The measures have been corrected for differential refraction, and from 1903 to 1906 inclusive, for instrumental constants.

A discussion of the observations of 1897–98 by Prof. S. J. Brown, U. S. N., is published in the Astronomical Journal, No. 473.

The observations at the opposition 1899–1900 have been discussed by Prof. T. J. J. See, U. S. N., in the Astronomische Nachrichten, Nr. 3663.

II. MEASURES OF DIAMETERS OF PLANETS AND SATELLITES.

Under this head are included measures of the diameters of the planets Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune; the North Polar Cap of Mars, the four bright satellites of Jupiter, and two of the satellites of Saturn, Titan and Japetus. Measures of the ring system of Saturn are also included. The following table gives the years in which they were observed and the number of observations in each year:

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Object. \ Year.	1897	1898	1899	1900	1901	1902	1903
Mercury	0	4	15	27	136	40	0
Venus	17	10	98	37	0	0	3
Mars	0	0	0	0	124	0	5
North Polar Cap	0	0	0	0	4	0	0
Jupiter	0	0	0	52	89	0	5
Satellite I	0	0	0	17	50	0	0
Satellite II	0	0	0	17	52	0	0
Satellite III	0	0	0	18	47	0	0
Satellite IV	0	0	0	18	44	0	0
Saturn	0	0	0	39	123	0	0
Ring System	0	0	0	131	25	0	0
Titan	0	0	0	12	41	0	0
Japetus	0	0	0	0	6	0	0
Uranus	0	0	0	47	66	57	0
Neptune	0	0	8	15	18	0	10

Mercury.—The diameters of Mercury have all been measured along the phase axis and therefore no correction has been necessary for phase. The correction for differential refraction is negligible in every case. A discussion of the measures made in 1900 and 1901 by Professor SEE is published in the Astronomische Nachrichten, Nr. 3737.

Venus.—The diameters of Venus have been measured along the phase axis and also in position angles 0°–180° and 90°–270°. The results are printed separately, and columns of corrections for differential refraction and for phase are given. The latter correction was computed by means of auxiliary quantities taken from the table Illuminated Disk of Venus in the American Ephemeris. A discussion of the measures in 1900 by Professor SEE is published in the Astronomische Nachrichten, Nr. 3676.

Mars.—The diameters of Mars have been measured along the phase axis, perpendicular to the phase axis, and in position angles 0°–180° and 90°–270°. The results are printed separately. A column is given for the correction for differential refraction and one for phase whenever appreciable. The latter correction for the diameters measured in position angles 0°–180° and 90°–270° was computed from auxiliary quantities taken from the table Illuminated Disk of Mars in the American Ephemeris.

The diameters measured perpendicular to the phase axis in 1901 were corrected for phase from Ephemeris for Physical Observations of Mars by A. C. D. CROMMELIN in Monthly Notices, Volume 60, page 232 et seq.

A discussion of the measures in 1901 by Professor SEE is published in the Astronomische Nachrichten, Nr. 3750.

Jupiter and satellites.—The equatorial and polar diameters of Jupiter were measured and the results are printed separately. Columns are given of corrections for differential refraction and for phase. The corrections for phase were taken from

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Ephemerides for Physical Observations of Jupiter by A. C. D. CROMMELIN in Monthly Notices, Volume 60, page 60, and Volume 61, page 94 et seq. The measured diameters of the satellites of course require no corrections. A discussion of the measures in 1900 by Professor SEE is published in the Astronomische Nachrichten, Nr. 3670. A discussion of the measures in 1901 by Professor SEE is found in the Astronomische Nachrichten, Nr. 3757 and Nr. 3764.

Saturn and the rings.—The equatorial diameter of Saturn only was measured. A column of corrections for differential refraction is given and one for phase. The latter correction was computed by the formula

$$\text{Phase} = d \tan^2 \frac{\pi}{2},$$

when d is the measured diameter and

$$\sin \pi = \frac{R \sin (l - L)}{\Delta}.$$

In the latter expression R is the distance of the Earth from the Sun, Δ is the distance of Saturn from the Earth, and $l - L$ is the difference in the heliocentric longitude of the Earth and Saturn.

In the measures of the ring system a column of corrections for differential refraction is given whenever it is appreciable.

No corrections of course are necessary to the measures of the diameters of Titan and Japetus.

Discussions of the measures in the different years by Professor SEE are published in the Astronomische Nachrichten, Nr. 3686, Nr. 3764, and Nr. 3768.

Uranus and Neptune.—The diameters of Uranus and Neptune were measured in position angles 0°–180° and 90°–270°. Corrections for differential refraction and for phase are negligible for both planets.

Discussions of the diameters of these planets by Professor SEE are published in the Astronomische Nachrichten, Nr. 3665, and Nr. 3768.

The measured diameters have all been reduced to the values corresponding to the distance unity.

In the years 1900, 1901, and 1902 color cells were used on the 26-inch equatorial by Professor SEE in his measures of diameters. The object of these cells was to absorb the outstanding blue light of the secondary spectrum. They were placed in front of the eyepiece and held in place by an adapter as described in the Astronomische Nachrichten, Nr. 3636. These cells were filled with different fluids and are designated by the numbers 1, 2, 3, 4, and 5.

The solution in cell 1 was bichromate of potash; in cell 2 was chromate of potash until July 15, 1900, after which date picric acid and chloride of copper in water; in cells 3 and 4 was chloride of copper and picric acid in alcohol. The solution used in cell 5 is uncertain.

III. OBSERVATIONS OF DOUBLE STARS.

The observations of double stars consist chiefly of those stars discovered by the STRUVES and by BURNHAM. Numbers 41, 116, 138, 139, 142, 183, 215, 325, 326, 332, 396, 423, 456, 523, and 565 in the following table are doubles which were discovered by Professor SKINNER in the course of his observations of stars in the Washing-

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ton A. G. Zones with the 9-inch transit circle. Numbers 215 and 325 are not contained in BURNHAM'S General Catalogue of Double Stars. Numbers 456 and 565 were independently discovered by Prof. W. J. HUSSEY and announced by him before the announcement of Professor SKINNER'S discovery.

No attempt has been made to discover new double stars. However, in the observations of asteroids, one comparison star, B. D. +4°405, was found by Mr. HAMMOND to have a faint companion and it is thought to be a new double.

Corrections for differential refraction have been applied whenever appreciable. The means of the measured position angles and distances have been taken for each year.

TABLE XII shows the double stars observed, the years in which they were observed, and the number of observations in each year.

TABLE XII.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
1	β 1014	0 2	+31 7	1899	1
2	Σ 3063	0 2	− 5 6	1901	4
				1903	1
				1904	3
3	Σ 3065	0 3	−14 47	1900	1
4	Σ 4	0 5	+ 7 54	1901	3
5	β 255	0 7	+27 52	1901	2
6	β 998	0 9	+ 6 2	1901	3
7	β 486	0 9	− 8 20	1901	2
8	Σ 12=35 Piscium	0 10	+ 8 16	1901	1
9	Hu 3	0 12	−10 54	1903	1
10	Σ 22=38 Piscium	0 12	+ 8 19	1901	3
11	β 393	0 13	−21 42	1899	1
12	β 256	0 15	−14 23	1900	1
				1904	1
13	β 1015	0 15	+11 45	1897	1
				1898	1
				1899	2
14	β 1093	0 16	+10 25	1899	1
15	β 777	0 16	− 0 49	1901	1
16	β 488	0 19	− 4 2	1901	1
				1904	1
17	H 322=12 Ceti	0 25	− 4 31	1901	1
18	β 1158 (B and C)	0 26	−10 38	1901	1
	(A and BC)			1901	1
19	Ho 212=13 Ceti (A and B)	0 30	− 4 9	1899	1
				1900	1
	(AB and C)			1899	1
20	β 395	0 32	−25 19	1899	2
				1900	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
21	Σ 49	0 36	− 7 47	1901	1
				1904	2
22	0Σ 18	0 37	+ 3 37	1901	1
23	β 494	0 42	− 1 48	1903	2
24	Σ 60=η Cassiopeiæ	0 43	+57 17	1899	1
				1902	1
25	Σ 67	0 47	+10 3	1906	1
26	O. Stone 3	0 47	−23 9	1903	2
				1904	2
27	O. Stone 4	0 48	−25 19	1904	2
28	Σ 74	0 50	+ 8 53	1902	1
29	β 302	0 53	+20 52	1898	2
30	S 390	0 53	−16 13	1902	3
				1904	3
31	β 234	0 56	−17 37	1904	2
32	Hn 62	0 57	− 9 24	1903	2
33	Σ 87	1 0	+14 52	1902	1
34	β 1228	1 1	+12 47	1899	2
35	β 501	1 2	− 5 11	1901	1
36	Σ 91	1 2	− 2 16	1901	2
				1902	3
				1903	1
				1904	1
37	β 502	1 3	+15 15	1901	1
38	0Σ 515=φ Andromedæ	1 4	+46 42	1899	1
39	β 303=201 Piscium	1 4	+23 16	1901	1
40	β 2	1 5	+29 20	1901	1
41	Skinner 1	1 7	−14 10	1900	1
42	β 503	1 12	+10 4	1899	2
				1901	1
43	β 504	1 12	+ 1 19	1897	3
				1899	3
				1901	1
				1902	1
44	Σ 113=42 Ceti	1 15	− 1 2	1901	1
				1902	1
				1903	2
45	H 2036=187 Ceti	1 15	−16 20	1902	1
46	β 4=255 Piscium (A and B)	1 16	+11 1	1899	2
	(AB and C)			1899	1
47	β 505=// Ceti	1 19	− 8 42	1899	1
48	Σ 120=202 Ceti	1 20	− 6 28	1901	1
49	Σ 122	1 22	+ 3 1	1901	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
50	β 1164=95 Piscium	1 22	+ 4 50	1901	1
51	β 399=211 Ceti	1 23	−11 25	1903	1
52	Hu 7	1 23	− 9 48	1903	1
53	β 869	1 31	+ 3 48	1901	1
54	β 5=103 Piscium	1 34	+16 7	1897 1898 1899	1 2 2
55	Σ 147=χ^1 Ceti	1 37	−11 49	1903 1904	1 2
56	β 509	1 38	+ 9 4	1897 1899	1 2
57	β 784	1 41	+22 24	1899	1
58	β 871	1 43	− 1 27	1903 1904	1 1
59	β 260	1 48	+14 56	1897 1898 1900	1 1 2
60	Σ 186	1 51	+ 1 21	1899	2
61	Σ 202=α Piscium	1 57	+ 2 17	1902	1
62	$O\Sigma$ 38=γ Andromedæ (B and C) (A and BC)	1 58	+41 51	1899 1899	1 1
63	β 516	2 0	− 1 27	1901	1
64	Σ 218	2 4	− 0 55	1901 1903 1905	1 2 1
65	Hastings	2 11	−18 42	1903	1
66	β 518=389 Ceti	2 24	+ 9 7	1901	1
67	Hammond [BD+4°405]	2 24	+ 4 26	1907 1908	1 1
68	β 519	2 25	− 2 43	1900 1901	1 1
69	Howe 6	2 27	− 8 0	1903	1
70	Σ 280	2 29	− 6 4	1903 1905	4 1
71	β 520	2 32	− 4 0	1900 1901	1 1
72	Ho 315	2 34	− 2 1	1903	3
73	Σ 295=84 Ceti	2 36	− 1 7	1902 1903	2 3
74	Σ 299=γ Ceti	2 38	+ 2 49	1902	1
75	β 10	2 45	− 5 24	1898 1900 1903	1 2 3
76	β 1174	2 59	−11 22	1900	2

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
77	β 527	3 1	−13 49	1900	1
78	A. Clark 2=95 Ceti	3 13	− 1 18	1899	2
79	β 12	3 20	−14 21	1903	1
80	β 532	3 28	−10 23	1900	1
81	β 1003	3 41	−28 11	1899 1900	1 1
82	0Σ 65	3 44	+25 17	1898	2
83	β 541	3 50	− 1 34	1899 1900	1 1
84	See	3 52	− 1 52	1900	1
85	β 543	3 52	− 1 27	1899 1900	1 1
86	β 1042 (A and B) (B and C)	3 54	− 2 56	1899 1899	1 1
87	β 1005	4 1	+28 40	1899	1
88	0Σ 531	4 1	+37 49	1898	1
89	Hu 817	4 12	+32 23	1907 1908	1 1
90	Σ 536	4 17	− 4 55	1903	2
91	β 744=299 Eridani	4 17	−25 58	1900	1
92	Σ 535=230 Tauri	4 18	+11 9	1902	1
93	β 1235	4 19	+22 31	1899	1
94	β 1186=248 Tauri	4 22	+10 59	1900	1
95	Σ 554=80 Tauri	4 24	+15 25	1900	1
96	Σ 590=55 Eridani	4 39	− 8 59	1903	1
97	β 883 (A and B)	4 46	+10 54	1899 1901 1902	3 1 1
	(AB and C)			1899 1902	2 1
98	β 552=11 Orionis	4 46	+13 29	1899 1902	3 1
99	β 1237	4 48	+23 23	1901	1
100	0Σ 90	4 50	+ 8 26	1898	1
101	β 314=3 Leporis (A and B)	4 55	−16 32	1898 1899	1 1
102	0Σ 93	4 55	+ 4 57	1898	1
103	Σ 636	4 58	− 8 48	1903	1
104	β 1047=47 Aurigæ (A and B)	5 3	+27 54	1899	1
105	β 885	5 6	− 1 53	1898 1899	1 2

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
106	Σ 661=κ Leporis	5 9	−13 4	1903	2
107	β 318	5 11	− 3 36	1898 1899	1 1
108	Σ 728=32 Orionis	5 25	+ 5 52	1899 1900	1 1
109	Σ 729=33 Orionis	5 26	+ 3 13	1903	1
110	Σ 738=λ Orionis	5 30	+ 9 51	1903	1
111	Σ 774=ζ Orionis (A and B)	5 36	− 2 0	1903	1
112	0Σ 115	5 39	+15 1	1898	1
113	0Σ 119	5 42	+ 7 56	1898	1
114	β 94=61 Leporis	5 45	−14 31	1903	1
115	β 16=3 Monocerotis	5 57	−10 36	1903	1
116	Skinner 2	6 0	−15 41	1900	1
117	Σ 840 (B and C)	6 1	+10 46	1898	1
118	0Σ 132	6 1	+38 0	1898	1
119	Hu 106	6 5	−11 40	1903	1
120	β 1008=η Geminorum	6 9	+22 32	1900	1
121	β 566=21 Monocerotis	6 10	− 4 32	1900	1
122	β 1019	6 11	− 2 51	1900	1
123	Hu 108	6 13	−10 41	1903	1
124	Σ 919=11 Monocerotis (A and B) (B and C)	6 24	− 6 58	1898 1898	1 1
125	Hu 43	6 29	−12 2	1903	1
126	Σ 3117	6 36	+ 9 50	1898	1
127	Σ 955 (A and B)	6 36	− 7 54	1903	1
128	Hu 46	6 38	−12 12	1903	1
129	A. G. Clark 1=Sirius	6 41	−16 35	1899 1900 1901 1902 1903	4 5 5 4 2
130	0Σ 156	6 42	+18 18	1898	1
131	Σ 963=14 Lyncis	6 44	+59 34	1899	2
132	β 897=97 Monocerotis	6 46	− 0 25	1901	1
133	0Σ 159=15 Lyncis	6 49	+58 33	1899	1
134	β 326	6 51	+ 2 27	1898	1
135	ε Canis Majoris	6 55	−28 50	1900	1
136	Hu 111	6 55	−11 52	1903	1
137	0Σ 163 (A and B)	6 56	+11 55	1898	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
138	Skinner 3	6 58	−17 38	1896	2
				1900	1
139	Skinner 4	7 1	−16 29	1896	2
				1900	1
140	Σ 1029	7 3	− 4 31	1905	1
141	0Σ 170	7 12	+ 9 28	1898	1
142	Skinner 5	7 15	−16 37	1896	1
				1900	1
143	Σ 1074	7 15	+ 0 35	1898	1
				1902	1
144	Hu 456	7 28	−17 18	1903	1
145	Σ 1110=α Geminorum	7 28	+32 6	1900	3
146	Σ 1107	7 32	+76 2	1899	1
147	0Σ 176	7 33	+ 0 44	1898	1
148	Schaeberle=Procyon	7 34	+ 5 29	1900	5
				1901	5
				1902	3
149	Hu 457	7 35	+23 29	1903	1
150	Σ 1126	7 35	+ 5 28	1897	1
151	0Σ 179=κ Geminorum	7 38	+24 38	1900	4
152	β 101=9 Argus	7 47	−13 38	1898	2
				1900	3
				1901	2
153	Σ 1157	7 50	− 2 32	1898	1
154	0Σ 185	7 52	+ 1 24	1898	1
				1899	2
155	Σ 1175	7 57	+ 4 26	1899	1
156	0Σ 186	7 57	+26 33	1898	1
157	0Σ 187	7 58	+32 19	1899	3
158	β 581 (A and B)	7 59	+12 35	1898	3
				1900	2
	(AB and C)			1901	2
				1898	1
				1900	2
				1901	2
159	Σ 1196=ζ Cancri (A and B)	8 6	+17 57	1897	2
				1898	1
				1899	2
				1900	2
	(AB and C)			1897	1
				1900	2
	(A and C)			1899	2
160	β 102	8 12	− 8 42	1903	1
161	β 206	8 31	−24 46	1903	1
162	Schiaparelli=ε Hydræ (A and B)	8 41	+ 6 47	1900	1
	(AB and C)			1900	3
				1902	1
163	Σ 1280	8 46	+71 11	1900	2

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
164	Schj. 11	8 47	−10 46	1903	1
165	Σ 1291 = ι^2 Cancri	8 48	+30 58	1897	1
166	β 24	8 49	− 8 23	1903	3
167	Σ 1295 = 17 Hydræ	8 51	− 7 35	1903	1
168	β 210	8 52	−17 3	1903	1
169	OΣ 196 = ι Ursæ Majoris	8 52	+48 26	1900	2
170	Σ 1296	8 53	+35 20	1900	1
171	Σ 1306 = σ^2 Ursæ Majoris	9 2	+67 32	1897 1899	1 6
172	OΣ 197	9 4	+ 3 21	1897	2
173	Σ 3121	9 12	+29 0	1897 1899	3 1
174	Σ 1334 = 38 Lyncis	9 13	+37 14	1897 1900	1 2
175	Σ 1331 (A and B)	9 13	+61 46	1897	3
176	Σ 1338 = 157 Lyncis	9 15	+38 37	1897 1900	1 1
177	β 337	9 18	−17 28	1907	1
178	OΣ 200	9 18	+52 0	1897 1900	2 2
179	OΣ 201	9 18	+28 20	1897	1
180	β 338	9 18	−15 4	1907	1
181	Σ 1348 = 116 Hydræ	9 19	+ 6 47	1897	1
182	Σ 1355	9 22	+ 6 40	1897	1
183	Skinner 6	9 22	−16 50	1900 1903	1 2
184	Σ 1356 = ω Leonis	9 23	+ 9 30	1897 1899 1900 1902	2 2 1 2
185	β 591	9 25	− 2 41	1903	1
186	Σ 1374 = 30 Leonis Minoris	9 35	+39 24	1900	2
187	Σ 1377	9 38	+ 3 5	1902	2
188	Σ 1385	9 44	+17 2	1898 1902	1 1
189	OΣ 208 = φ Ursæ Majoris	9 45	+54 32	1899	3
190	Σ 1389	9 47	+27 27	1897	2
191	Σ 1386	9 47	+69 22	1897 1900	2 2
192	A. Clark 5 = 8 Sextantis (A and B)	9 48	− 7 38	1897 1900 1901 1902	1 3 4 3
	(AB and C)			1901	3

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
193	H 825	9 55	−14 29	1907	1
194	Σ 1406	10 0	+31 34	1899	1
195	Hd 125	10 2	− 1 14	1903 1905	2 1
196	Σ 1416	10 7	−15 36	1903	1
197	0Σ 213	10 8	+27 55	1899	1
198	0Σ 215	10 11	+18 14	1897 1899 1902	3 1 1
199	0Σ 523=39 Leonis	10 12	+23 36	1899	1
200	Σ 1423	10 14	+21 4	1899	1
201	Σ 1424=γ Leonis	10 14	+20 21	1897 1900	1 3
202	Σ 1426=145 Leonis (A and B) (AB and C)	10 15	+ 6 56	1897 1897	3 1
203	Hn 103	10 16	−15 51	1903	2
204	Hn 104	10 16	−16 13	1907	1
205	β 25=Schj. 16	10 17	− 9 16	1903 1905	3 1
206	β 219	10 17	−22 2	1903	3
207	0Σ 216=150 Leonis	10 17	+15 51	1899	3
208	H 4311	10 18	−12 52	1903	1
209	Σ 1429	10 19	+25 8	1897	2
210	Σ 1428	10 20	+53 8	1900	2
211	0Σ 217	10 21	+17 44	1899	1
212	0Σ 218	10 22	+ 4 4	1899	1
213	Σ 1439	10 25	+21 19	1897 1900	3 1
214	Σ 1441	10 26	− 7 7	1903	4
215	Skinner 14	10 27	−15 53	1907	1
216	Σ 1445	10 28	− 0 21	1899 1903	1 1
217	Σ 1450=49 Leonis	10 30	+ 9 10	1897 1900 1902	1 3 1
218	β 411	10 31	−26 9	1903	2
219	Σ 1457	10 34	+ 6 15	1897 1900	2 2
220	Hn 108	10 34	−17 3	1903	3
221	0Σ 224	10 34	+ 9 22	1899 1900 1902	6 1 1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
222	0Σ 225	10 35	+19 46	1900	1
223	0Σ 227	10 36	+11 16	1897	3
224	Σ 1470	10 41	− 5 14	1903	4
225	0Σ 228	10 42	+23 6	1897	2
226	0Σ 229	10 42	+41 38	1897	3
227	β 595	10 43	−14 26	1903	1
228	Σ 1476	10 44	− 3 30	1903	5
229	β 111	10 46	− 8 34	1903	3
230	0Σ 230	10 49	+21 18	1900	1
231	Σ 1487=54 Leonis	10 50	+25 17	1900	1
232	Σ 1500	10 55	− 2 56	1897 1900 1903	2 2 5
233	ΨI. 77	10 57	−15 9	1903	4
234	Howe 25	10 58	−26 59	1903	4
235	Σ 1504	11 0	+ 4 11	1897 1900	2 2
236	β 599=65 Leonis	11 2	+ 2 30	1900 1901	2 2
237	Σ 1517	11 8	+20 41	1897 1900	3 2
238	β 916=31 Crateris	11 9	−14 53	1900 1901 1903	2 1 1
239	0Σ 232	11 10	+38 7	1899	1
240	β 600=36 Crateris (A and B) (AB and C)	11 12	− 6 35	1900 1900	2 2
241	0Σ 233	11 13	+67 14	1900	2
242	Σ 1523=ξ Ursæ Majoris	11 13	+32 6	1897 1900	4 4
243	Σ 1527=339 Leonis	11 14	+14 49	1900	4
244	Σ 1534	11 17	+18 44	1900	2
245	Σ 1536=ι Leonis	11 19	+11 5	1900	4
246	β 26	11 19	− 9 52	1900 1903	2 4
247	H 840=γ Crateris	11 20	−17 8	1903	4
248	Σ 1543=57 Ursæ Majoris	11 24	+39 53	1900	3
249	Jacob 6	11 25	−23 55	1903	4
250	β 340	11 25	+ 3 46	1900	2
251	0Σ 234	11 25	+41 50	1897 1899	1 3

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
252	0Σ 235	11 27	+61 38	1897	1
				1899	3
253	♅III. 96=17 Crateris	11 27	−28 43	1903	3
254	Σ 1552=90 Leonis (A and B)	11 30	+17 21	1900	2
				1902	1
255	Σ 1555 (A and B)	11 31	+28 20	1899	2
				1900	2
256	Σ 1553	11 31	+56 41	1900	2
257	β 456	11 32	−11 48	1900	1
258	Σ 1560	11 33	− 1 53	1903	4
259	0Σ 237	11 34	+41 42	1897	3
260	H 4478=β Hydræ	11 48	−33 21	1903	2
261	β 794 (A and B)	11 48	+74 19	1899	2
262	0Σ 241	11 51	+36 0	1899	1
263	β 918	11 52	+32 46	1900	2
264	H 4481	11 52	−21 59	1903	4
265	0Σ 243	11 55	+53 57	1897	1
266	β 457	11 56	−20 58	1900	1
267	Σ 1593	11 58	− 1 53	1900	2
				1903	6
268	Σ 1596=2 Comæ	11 59	+22 1	1900	4
				1902	1
269	β 458	11 59	−20 29	1900	1
270	β 412	12 3	−18 1	1903	4
				1904	1
271	Σ 1604=59 Virginis (A and B)	12 4	−11 18	1900	2
				1903	4
	(A and C)			1900	2
272	Σ 1606	12 6	+40 27	1897	3
273	S 634	12 6	−16 14	1903	4
274	Σ 1619	12 10	− 6 42	1903	4
275	β 920=17 Corvi	12 11	−22 48	1903	2
276	Σ 1621	12 11	+ 6 12	1897	1
277	β 605	12 15	−21 37	1903	1
278	Σ 1630=68 Comæ	12 19	+26 8	1900	4
279	Σ 1641	12 20	+38 17	1897	1
280	β 606=35 Corvi	12 21	−14 24	1899	2
				1900	1
281	Hn 13	12 21	− 1 20	1903	4
282	Σ 1643	12 22	+27 35	1897	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
283	β 28	12 25	−12 50	1903	4
284	Σ 1647=191 Virginis	12 25	+10 16	1897	1
				1900	2
285	β 797 (A and B)	12 29	+ 6 31	1899	2
				1900	1
	(AB and C)			1900	1
286	Σ 1658	12 30	+ 8 0	1897	1
				1900	2
287	Σ 1661	12 31	+11 58	1897	1
				1900	2
288	Σ 1668=270 Virginis	12 36	+ 9 23	1897	2
289	Σ 1669=58 Corvi (A and B)	12 36	−12 28	1900	2
				1903	5
	(A and C)			1900	1
290	Σ 1670=γ Virginis (A and B)	12 37	− 0 54	1899	2
				1900	2
				1901	2
				1903	4
291	β 924=31 Virginis	12 37	+ 7 21	1900	1
				1901	2
292	Σ 1687=35 Comæ (A and B)	12 48	+21 47	1900	1
	(A and C)			1900	3
293	Σ 1690	12 51	− 4 19	1903	4
294	0Σ 256	12 51	− 0 25	1897	1
				1900	1
295	0Σ 257	12 52	+46 9	1900	3
296	O. Stone 27	12 53	−12 36	1903	4
297	β 926	12 53	− 5 30	1901	2
298	β 112 (B and C)	12 56	+18 55	1901	2
	(A and B)			1901	2
299	Σ 1707	12 56	+16 24	1900	3
300	β 928 (A and B)	12 58	− 5 54	1901	1
				1903	3
	(A and C)			1901	1
301	0Σ 260	13 3	+27 49	1899	2
302	Σ 1722=179 Comæ	13 4	+16 2	1900	2
303	Σ 1724=θ Virginis (A and B)	13 5	− 5 0	1903	4
304	Σ 1728=42 Comæ	13 5	+18 3	1899	3
305	β 609	13 6	− 4 24	1901	1
306	0Σ 261	13 7	+32 37	1897	1
				1900	2
307	Sh 161=54 Virginis	13 8	−18 18	1903	2
308	β 342	13 10	−18 23	1903	2
309	β 800=201 Comæ	13 12	+17 33	1899	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
310	Σ 1738	13 18	−14 24	1903	1
311	β 237	13 22	+14 54	1899	1
312	0Σ 267	13 24	+76 30	1899	1
313	β 113	13 24	+12 0	1899	1
314	0Σ 269	13 28	+35 25	1899	3
315	β 114	13 29	− 8 6	1903	3
316	β 932=550 Virginis (A and B)	13 29	−12 42	1899	3
317	β 933 (A and B)	13 30	+33 39	1899	1
	(A and C)			1899	1
318	Σ 1763=81 Virginis	13 32	− 7 22	1903	4
319	Σ 1768=25 Canum Venaticorum	13 33	+36 48	1899	2
320	Σ 1771	13 34	+70 17	1900	2
321	β 612	13 35	+11 15	1899	3
322	Σ 1776	13 38	+46 44	1900	2
323	Σ 1781	13 41	+ 5 37	1897	1
				1899	3
324	Σ 1785	13 45	+27 29	1897	1
				1900	2
325	Skinner 15	13 47	−15 40	1907	1
326	Skinner 7	13 49	−14 38	1900	2
327	Σ 1788	13 50	− 7 34	1903	4
328	0Σ 273	13 51	+ 5 47	1897	1
329	Σ 1799	14 0	− 6 4	1903	2
330	Σ 1802	14 3	−12 27	1903	1
331	Hn 16	14 3	− 3 4	1903	2
332	Skinner 8	14 5	−14 20	1900	2
				1903	1
333	0Σ 278	14 8	+44 40	1899	1
334	Σ 1813	14 8	+ 5 52	1900	3
335	β 939 (A and B)	14 9	− 8 3	1899	2
336	Σ 1816	14 9	+29 34	1900	2
337	Σ 1820	14 10	+55 48	1897	1
				1900	3
338	Σ 1819	14 10	+ 3 36	1897	1
339	0Σ 281	14 15	+ 9 2	1897	1
340	Σ 1837	14 19	−11 13	1897	1
				1903	1
341	β 225 (B and C)	14 20	−19 31	1903	1
342	Σ 1842	14 22	+ 4 8	1897	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
343	β 462 (A and B)	14 25	− 3 16	1903	1
344	β 117	14 26	−15 11	1899	1
345	Σ 1858	14 30	+36 1	1900 1901	3 1
346	Σ 1864=π Bootis	14 36	+16 51	1899 1900	1 2
347	Σ 1865=ζ Bootis	14 36	+14 9	1899	1
348	Σ 1866	14 37	+ 9 57	1897	1
349	β 807	14 38	− 6 23	1901	1
350	Σ 1871	14 38	+51 50	1897 1900	1 2
351	Σ 1877=ϵ Bootis	14 41	+27 30	1899 1900	3 3
352	Σ 1876	14 41	− 6 58	1897 1903	1 1
353	Σ 1879	14 41	+10 5	1897 1899	2 5
354	0Σ 285	14 42	+42 48	1899	2
355	β 346=23 Libræ	14 43	−16 55	1901	1
356	Σ 1883	14 44	+ 6 22	1897 1901	1 1
357	Σ 1884=286 Bootis	14 44	+24 47	1897	1
358	Σ 1888=ξ Bootis	14 47	+19 31	1897 1899 1901 1902	2 8 1 3
359	0Σ 287	14 48	+45 20	1897	1
360	0Σ 288	14 49	+16 7	1897 1900	1 3
361	0Σ 289	14 52	+32 42	1899	1
362	β 239=59 Hydræ	14 53	−27 15	1901	1
363	β 808 (A and B)	14 53	− 8 17	1901	1
	(AB and C)			1901	1
364	β 348=2 Serpentis	14 57	+ 0 15	1899	2
365	β 119	15 0	− 6 38	1903	3
366	Σ 1909=44 Bootis	15 0	+48 3	1899 1900	2 3
367	Σ 1908	15 1	+34 51	1897	1
368	Σ 1910	15 3	+ 9 37	1899	1
369	Σ 3090	15 4	− 0 36	1903	3
370	β 349	15 4	+ 2 4	1901	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
371	β 809	15 4	−22 21	1903	1
372	β 350	15 10	−27 14	1903	1
373	0Σ 294	15 10	+56 25	1897	1
374	Σ 1926	15 11	+38 40	1899	1
375	Σ 1925	15 12	− 7 55	1903	2
376	β 227	15 13	−23 54	1903	2
377	β 228	15 14	−23 54	1903	1
378	Σ 1934	15 14	+44 10	1900	2
379	Σ 1932=1 Coronæ	15 14	+27 12	1897	2
380	Σ 1937=η Coronæ	15 19	+30 39	1897 1899	2 2
381	Σ 1938=μ^2 Bootis	15 21	+37 42	1897 1899	2 1
382	Σ 1944	15 23	+ 6 27	1897	1
383	0Σ 296	15 23	+44 21	1900	2
384	β 33	15 26	−12 39	1903	2
385	Σ 1956	15 30	+42 9	1900	2
386	Σ 1954=δ Serpentis	15 30	+10 52	1899 1900 1902	1 3 2
387	0Σ 298	15 32	+40 8	1897 1900	2 2
388	0Σ 299	15 32	+64 14	1897 1900	1 2
389	β 122	15 34	−19 27	1903	2
390	Howe 37	15 35	−14 30	1907	1
391	Σ 1965=ζ Coronæ	15 36	+36 58	1900	3
392	β 35	15 37	−15 42	1903	2
393	Σ 1967=γ Coronæ	15 39	+26 37	1897 1899	2 2
394	Σ 1969	15 39	+60 18	1899	1
395	Σ 1974	15 44	− 2 56	1903	2
396	Skinner 9	15 47	−16 56	1895 1900	1 3
397	β 810	15 48	+42 46	1899	2
398	Σ 1985	15 51	− 1 52	1899 1900 1903	1 2 1
399	Σ 3101	15 54	− 2 47	1903	1
400	β 623	15 56	− 6 41	1903	2

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
401	0Σ 303	15 56	+13 33	1897	1
				1899	1
				1902	2
402	Σ 1998=ξ Scorpii (A and B)	15 59	−11 6	1898	2
				1899	2
	(AB and C)			1899	2
403	β 120=ν Scorpii (A and B)	16 6	−19 12	1899	1
	(A and C)			1899	1
	(C and D)			1899	1
404	Σ 2022	16 9	+26 56	1899	1
405	Σ 2021=49 Serpentis	16 9	+13 48	1900	3
				1902	4
406	Σ 2027	16 10	+ 4 31	1897	1
407	Σ 2032=σ Coronæ (A and B)	16 11	+34 7	1897	1
				1900	2
408	Σ 2026	16 11	+ 7 37	1897	3
409	0Σ 309	16 16	+41 54	1897	1
410	Σ 2041	16 17	+ 1 27	1897	1
411	Σ 2044	16 21	+37 16	1900	2
412	Σ 2054=99 Draconis	16 22	+61 55	1900	2
413	α Scorpii	16 23	−26 13	1899	1
				1900	2
				1902	2
414	Σ 2048	16 23	− 7 54	1903	1
415	Σ 2049	16 24	+26 12	1896	1
416	Σ 2052=71 Herculis	16 24	+18 37	1897	2
				1900	2
417	Σ 3104	16 25	−14 20	1907	1
418	Σ 2055=λ Ophiuchi	16 26	+ 2 12	1896	1
				1899	1
				1900	3
419	0Σ 313	16 29	+40 20	1897	1
420	0Σ 314	16 35	+20 40	1897	1
421	Σ 2084=ζ Herculis	16 38	+31 47	1899	2
422	Σ 2091	16 39	+41 23	1897	2
423	Skinner 10	16 40	−17 10	1895	2
				1900	3
424	Δ 15	16 41	+43 40	1899	2
425	Σ 2097	16 41	+35 55	1900	2
426	β 43	16 43	+ 2 55	1898	1
427	Σ 2107=167 Herculis	16 48	+28 50	1899	1
428	Σ 3106	16 50	− 5 0	1903	4

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
429	*0Σ* 318	16 52	+14 18	1900	1
430	*0Σ* 319	16 54	+15 18	1897	1
431	*Σ* 3107	16 54	+ 4 7	1902	1
432	*0Σ* 322	16 56	+37 4	1897	1
433	*Σ* 2119	17 1	−13 48	1903	6
434	*Σ* 2130=*μ* Draconis (A and B)	17 3	+54 36	1900	2
435	*0Σ* 324	17 4	+31 20	1897	1
436	*β* 1118=*η* Ophiuchi (A and B)	17 5	−15 36	1899	1
437	*β* 124	17 5	− 0 38	1903	3
438	*Σ* 2132	17 7	− 3 56	1903	3
439	*Σ* 2135	17 8	+21 21	1900	2
440	*0Σ* 325	17 8	+ 7 52	1897	1
441	*Σ* 2140=*α* Herculis (A and B)	17 10	+14 30	1899 1900	1 2
442	*0Σ* 328=68 Herculis	17 14	+33 12	1897	1
443	*β* 628	17 15	+32 46	1898	1
444	*β* 959	17 17	+ 5 6	1898	2
445	*β* 242 (A and B)	17 18	−11 36	1898 1903	1 1
	(A and C)			1898	1
	(A and D)			1898	1
446	*β* 46	17 19	+13 30	1898	2
447	*β* 1249 (A and B)	17 20	+53 57	1898	1
	(A and C)			1898	1
448	*Σ* 2161=*ρ* Herculis	17 20	+37 14	1899	1
449	*Σ* 2165=281 Herculis	17 22	+29 32	1900	2
450	*Σ* 2171	17 24	− 9 55	1897 1903	1 3
451	*Σ* 2173=221 Ophiuchi	17 25	− 0 59	1896 1899 1903	3 1 5
452	*0Σ* 331	17 27	+ 2 54	1897	2
453	*Σ* 2190	17 32	+21 4	1900	2
454	*β* 960	17 33	− 1 6	1898	2
455	*Σ* 2192=315 Herculis	17 36	+29 18	1900	1
456	Hu 184	17 36	−15 40	1895 1900	2 3
457	*β* 1251	17 37	+16 0	1898	1
458	*Σ* 2218	17 40	+63 43	1900	2

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
459	Σ 2205	17 41	+17 45	1900	2
460	A. Clark 7=μ Herculis (B and C)	17 43	+27 47	1897	3
				1906	5
461	β 824	17 44	− 1 50	1898	1
				1903	1
462	0Σ 338	17 47	+15 21	1898	1
463	A. Clark 9	17 50	+29 50	1899	1
464	Σ 2244	17 52	+ 0 5	1897	1
465	β 417	17 53	+39 27	1898	2
466	Σ 2262=τ Ophiuchi	17 58	− 8 11	1896	3
				1899	1
				1900	2
				1903	5
467	β 635 (A and B)	17 58	+ 1 37	1898	2
	(A and C)			1898	2
468	Σ 2271	17 58	+52 51	1900	1
469	Σ 2267	17 58	+40 11	1900	1
470	Σ 2275	18 0	+39 21	1897	1
471	Σ 2272=70 Ophiuchi (A and B)	18 0	+ 2 31	1896	3
				1898	2
				1899	8
				1900	10
				1901	2
				1902	1
	(B and C)			1899	2
				1900	4
	(A and C)			1899	1
	(B and E)			1900	1
	(B and D)			1900	1
472	β 636 (A and B)	18 3	+ 2 12	1898	1
473	Σ 2283	18 5	+ 6 8	1897	3
474	β 132	18 5	−19 52	1903	4
475	β 638 (B and C)	18 5	+ 2 34	1898	1
	(A and B)			1898	1
476	Hu 317	18 7	+17 12	1903	1
477	β 131 (A and B)	18 8	−15 37	1903	4
	(A and C)			1903	3
478	0Σ 345	18 8	+ 5 48	1897	1
479	Hn 142	18 9	−11 16	1903	4
480	Σ 2296	18 10	− 3 23	1903	4
481	β 463	18 12	−16 54	1903	2
482	Schj. 16	18 14	− 5 0	1903	4
483	Σ 2303	18 15	− 8 1	1897	1*
				1900	2
				1903	3

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
484	β 48	18 15	−19 42	1903	3
485	Σ 2312	18 17	+28 17	1897	1
486	Σ 2313	18 19	− 6 39	1903	4
487	$O\Sigma$ 350	18 22	+ 6 22	1897	1
488	Σ 2316=59 Serpentis	18 22	+ 0 8	1900	3
489	β 419	18 27	− 7 54	1903	1
490	Σ 2345	18 31	+21 0	1901	1
491	$O\Sigma$ 359	18 31	+23 32	1897	1
492	Σ 2347=196 Serpentis	18 33	− 0 28	1903	2
493	$O\Sigma$ 360	18 34	+ 4 46	1897	1
494	Σ 2373	18 40	−10 36	1903	3
495	Σ 2375	18 41	+ 5 24	1901	1
496	Σ 2379=5 Aquilæ (A and B)	18 41	− 1 4	1903	1
497	β 970	18 45	− 8 6	1903	1
498	Σ 2409	18 47	+13 24	1897	1
499	β 648	18 53	+32 46	1897 1898	2 1
500	Σ 2434 (B and C)	18 58	− 0 51	1898 1903	1 1
501	S 710	19 1	−16 23	1903	1
502	Σ 2464	19 5	+11 42	1898	1
503	$O\Sigma$ 369	19 9	+71 55	1897	1
504	Σ 2525=22 Cygni	19 22	+27 7	1898 1899	1 2
505	$O\Sigma$ 376	19 31	+33 59	1901	1
506	$O\Sigma$ 384	19 40	+38 5	1897	1
507	Σ 2576	19 42	+33 22	1901	2
508	Σ 2583=π Aquilæ	19 44	+11 34	1901	1
509	♅ I. 93	19 57	− 0 28	1903	1
510	β 1205	20 7	− 8 23	1897	1
511	$O\Sigma$ 400	20 7	+43 39	1899	3
512	$O\Sigma$ 403 (A and B) (A and C)	20 11	+41 48	1899 1899	1 1
513	β 1206	20 15	+36 26	1897	1
514	Schj. 25	20 15	− 8 3	1903	1
515	β 432	20 21	+35 26	1897	1
516	β 63=1 Delphini (A and B)	20 26	+10 34	1897	2

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
517	β 670	20 28	+13 36	1897	1
518	β 1208	20 30	+ 6 32	1897	1
519	β 151=β Delphini (A and B)	20 33	+14 15	1897 1898 1899 1901	1 2 6 1
520	0Σ 410 (A and B)	20 36	+40 14	1897	1
521	β 152=55 Cephei	20 40	+57 2	1897	1
522	β 64 (A and B)	20 40	+12 22	1897	1
523	Skinner 11	20 41	−17 4	1895 1900 1904	3 2 3
524	β 65=13 Delphini	20 43	+ 5 38	1897	2
525	0Σ 413=λ Cygni (A and B)	20 44	+36 7	1899	1
526	β 67	20 46	+30 32	1897	1
527	β 154	20 47	−16 32	1904	2
528	β 155 (A and B)	20 48	+51 2	1897	1
529	0Σ 417 (A and B)	20 49	+28 46	1897	1
530	β 367 (A and B)	20 51	+27 43	1897	1
531	0Σ 419	20 51	+36 42	1897	1
532	β 678	20 55	− 8 44	1897	1
533	Σ 2745=12 Aquarii	20 59	− 6 13	1902	2
534	β 681	21 9	+16 30	1897	1
535	A. G. Clark 13=τ Cygni (A and B)	21 11	+37 37	1899	6
536	Σ 2783	21 11	+57 53	1899	2
537	β 838	21 16	+ 2 42	1897	1
538	β 1262	21 17	−15 20	1904	1
539	Σ 2797	21 22	+13 15	1901	1
540	Σ 2799=20 Pegasi	21 24	+10 39	1901	1
541	Σ 2802	21 28	+33 22	1901	2
542	Σ 2804	21 28	+20 16	1901	2
543	β 1212=24 Aquarii (A and B) (A and C)	21 34	− 0 30	1897 1899 1897	1 1 1
544	Σ 2822=μ Cygni (A and B) (A and C)	21 40	+28 18	1901 1901	2 1
545	β 989=κ Pegasi (A and B) (AB and C)	21 40	+25 11	1899 1901	4 2
546	Σ 2825	21 42	+ 0 23	1901	1

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
547	Hu 281	21 44	+ 4 55	1903	1
548	Hu 89	21 46	−12 7	1903	1
549	Hu 379	21 48	+ 4 50	1903	1
550	β 693	21 51	− 7 27	1903	1
551	Σ 2847	21 53	− 3 58	1903	2
552	H 3074	21 53	− 2 18	1903	1
553	S 802=29 Aquarii	21 57	−17 27	1902 1904	2 3
554	0Σ 463	22 5	+13 16	1901	1
555	Sh 339=41 Aquarii	22 9	−21 34	1902 1903 1904	2 1 3
556	Σ 2877	22 10	+16 42	1901	1
557	β 843	22 20	+ 2 9	1897	1
558	Sh 345=53 Aquarii (A and B)	22 21	−17 15	1902 1903 1904	2 1 3
559	β 701	22 23	+11 44	1897	1
560	Σ 2910	22 23	+23 1	1901	1
561	Σ 2909=ζ Aquarii	22 24	− 0 32	1901 1902 1903 1904	1 2 1 3
562	Σ 2912=37 Pegasi	22 25	+ 3 56	1899 1901	6 1
563	Σ 2915	22 28	+ 6 54	1901	1
564	Σ 2935	22 38	− 8 50	1904	1
565	Hu 289	22 38	−16 40	1895 1900	1 2
566	β 711	22 40	+10 40	1897	1
567	Σ 2944 (A and B)	22 43	− 4 45	1904	3
568	β 177	22 47	−22 14	1904	1
569	β 1010	22 50	− 6 7	1903 1904	1 1
570	Σ 2959 (A and B)	22 52	− 3 47	1901	1
571	0Σ 536	22 54	+ 8 50	1901	1
572	0Σ 483=52 Pegasi	22 54	+11 12	1901	1
573	β 384=265 Aquarii	22 57	−19 5	1904	1
574	Hu 398	22 57	+18 4	1903	1
575	Σ 2988=284 Aquarii	23 7	−12 29	1903 1904	1 3

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TABLE XII—Continued.

No.	Name.	R. A. 1900.	Decl. 1900.	Year.	No. of Obs.
		h m	° ′		
576	β 79 (A and B)	23 12	− 2 4	1897	1
				1899	1
				1903	1
577	β 80	23 14	+ 4 52	1899	1
578	H 3184	23 16	−19 5	1904	3
579	Σ 3008	23 19	− 9 0	1903	4
580	β 719	23 19	+13 56	1897	1
581	β 720=72 Pegasi	23 29	+30 46	1899	2
582	β 81	23 30	−12 8	1897	1
				1899	1
583	β 721	23 31	− 7 40	1899	3
584	Σ 3030	23 36	− 0 56	1903	1
				1904	4
585	β 1223	23 40	+ 4 34	1899	1
586	Hu 300	23 40	+ 5 56	1903	1
587	Sh 356=107 Aquarii	23 41	−19 14	1904	3
588	Σ 3036	23 41	− 0 18	1904	1
589	β 726	23 41	−13 19	1899	1
590	Σ 3046	23 51	−10 3	1903	2
				1904	1
591	Σ 3050=37 Andromedæ	23 54	+33 10	1902	2
592	β 731	23 54	− 8 22	1903	1
				1904	2
593	β 733=85 Pegasi (A and B)	23 57	+26 34	1899	3

IV. OBSERVATIONS OF MINOR PLANETS AND COMETS.

The following lists of 247 asteroids and 45 comets have been observed.

Many of the asteroids have been observed at more than one opposition. Asteroids [1903 NF] and (536) Merapi were discovered at this observatory by Assistant G. H. PETERS, and a great many of the others were found by means of photographic plates exposed by him for that purpose.

An attempt has been made to observe systematically the asteroids discovered by Rev. JOEL H. METCALF, of Taunton, Mass., and to secure a sufficient number of observations so that orbits could be computed by means of which the asteroids might be found and identified at the following oppositions. The list contains 20 of these asteroids.

The periodic comets ENCKE and BROOKS [1896 VI] have each been observed at two returns.

The asteroids and comets, with the exception of the periodic comets, are arranged in the order of their discovery, and the observations of each object are printed in chronological order.

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In the reduction of the star places to the epoch of observation the precession constants of STRUVE and PETERS were used until the beginning of the year 1905, after which date the constants of the Paris Conference were adopted and used. Proper motion has been applied whenever given in the catalogue from which the star position was taken.

A comparison of the observations of an asteroid with its ephemeris has been given whenever possible.

Table XIII shows the asteroids observed, the opposition at which they were observed, and the number of observations at each opposition.

TABLE XIII.

Asteroid.	Opposition.	Number of Observations.	Asteroid.	Opposition.	Number of Observations.
(1) Ceres	1905	6	(18) Melpomene	1903	4
	1906	4		1904	4
(2) Pallas	1904	6	(19) Fortuna	1898	1
	1906	6		1900	2
				1904	5
(3) Juno	1904	6		1905	6
(5) Astræa	1903	5	(20) Massalia	1903	5
(6) Hebe	1895	6	(21) Lutetia	1904	5
	1897	1		1905	6
	1899	1			
	1903	4	(22) Kalliope	1904	5
(7) Iris	1898	5	(23) Thalia	1903	6
	1904	5			
	1906	5	(24) Themis	1898	2
(8) Flora	1896	3	(26) Proserpina	1894	4
	1904	5		1901	4
	1907	3		1904	2
(9) Metis	1903	5		1905	8
				1906	3
(10) Hygiea	1904	6	(27) Euterpe	1903	5
(11) Parthenope	1895	1	(28) Bellona	1894	2
	1896	1		1903	5
	1897	3		1905	8
	1899	2		1906	6
	1901	1			
	1903	4	(29) Amphitrite	1903	5
	1904	5		1905	2
	1905	2			
(12) Victoria	1903	5	(30) Urania	1904	5
				1905	6
(13) Egeria	1904	3	(31) Euphrosyne	1907	12
(14) Irene	1903	5	(32) Pomona	1904	3
	1905	10			
	1907	2	(33) Polyhymnia	1896	6
				1898	1
(15) Eunomia	1903	9			
	1905	6	(37) Fides	1904	7
(16) Psyche	1897	2			
	1903	5	(39) Laetitia	1903	5
	1905	1			
	1907	2	(40) Harmonia	1904	3
(17) Thetis	1903	5	(42) Isis	1902	1
	1904	5		1903–1904	3
	1906	7		1905	4

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TABLE XIII—Continued.

Asteroid.	Opposition.	Number of Observations.
(43) Ariadne	1903	2
(44) Nysa	1904	3
(46) Hestia	1904	3
	1905	5
(47) Aglaga	1895	1
	1904	3
	1906	1
(49) Pales	1895	1
	1904	1
(51) Nemausa	1896	3
	1903	5
	1905	5
(52) Europa	1907	3
(53) Kalypso	1903	7
	1905	4
	1907	4
(56) Melete	1903	5
(57) Mnemosyne	1903	5
	1904	5
(58) Concordia	1895	2
	1905	1
(60) Echo	1903	5
(61) Danæ	1897	6
(63) Ausonia	1903	5
	1907	2
(64) Angelina	1903	5
	1905	9
(65) Cybele	1898	2
	1903–1904	2
	1905	1
	1906	3
(67) Asia	1903	5
(68) Leto	1899	7
	1903	5
	1906	2
(69) Hesperia	1903	4
(71) Niobe	1898	3
(72) Feronia	1903	1
(76) Freia	1898	1
(78) Diana	1905	5
(79) Eurynome	1899	2
	1901	6
	1903	4
	1904	3
	1905	8
(80) Sappho	1895	3
	1896	1
	1903	6
	1906	6
(81) Terpsichore	1903	3
(82) Alkmene	1905	5
(83) Beatrix	1903	5
(84) Klio	1904	1
	1905	6
(86) Semele	1906	2
(87) Sylvia	1894	3
	1897	2
(89) Julia	1903	5
(90) Antiope	1899	7
	1904	1
	1905	5
(92) Undina	1895	2
	1906	3
(93) Minerva	1899	8
	1900	3
	1902	3
(94) Aurora *	1907–1908	6
(95) Arethusa	1894	7
	1905–1906	4
(100) Hekate	1907	4
(101) Helena	1893	5
(103) Hera	1904	2
(105) Artemis	1904	4
	1907	3
(106) Dione	1895	1
	1906	1
(108) Hecuba	1904	1
(110) Lydia	1903	4
(113) Amalthea	1897	2
	1898	2
	1904	5
(114) Kassandra *	1903	5
(116) Sirona	1904	1
(117) Lomia	1905	5
(118) Peitho	1899	1
	1906	4
(119) Althea *	1894	9
	1903	4
	1907	4

* Identity uncertain.

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TABLE XIII—Continued.

Asteroid.	Opposition.	Number of Observations.	Asteroid.	Opposition.	Number of Observations.
(121) Hermione	1896	1	(194) Prokne	1897	7
(122) Gerda	1905	7	(196) Philomela	1903	5
(124) Alkeste	1905	5	(198) Ampella	1903	7
				1905	6
(126) Velleda	1906	4			
			(199) Byblis	1903	3
(129) Antigone	1903	5			
			(200) Dynamene*	1907–1908	5
(130) Elektra	1897	3			
	1904	6	(202) Chryseis	1904	4
(134) Sophrosyne	1894	5	(207) Hedda	1903	5
(139) Juewa	1898	1	(208) Lacrimosa	1904	1
	1904	4			
	1907	5	(211) Isolda	1905	5
(148) Gallia	1898	1	(212) Medea	1905	3
(153) Hilda	1904	1	(224) Oceana	1905	6
(154) Bertha	1903	4	(225) Henrietta	1903	3
	1904	3			
			(230) Athamantis	1903	5
(156) Xanthippe	1904	3			
			(234) Barbara	1905	3
(158) Koronis	1906	5			
			(236) Honoria	1903	3
(161) Athor	1903	3			
			(241) Germania	1894	2
(163) Erigone	1903	8		1904	2
	1905	4			
			(245) Vera	1907	11
(168) Sibylla	1907	5			
			(247) Eukrate	1898	3
(169) Zelia	1905	7			
			(257) Silesia	1905	4
(170) Maria	1904	4			
			(260) Huberta	1906	9
(171) Ophelia	1895	1			
	1897	1	(263) Dresda	1906	1
(172) Baucis	1904	2	(268) Adorea	1906–1907	6
(174) Phædra	1907	4	(270) Anahita	1903	10
				1905	3
(175) Andromache	1907–1908	5			
			(271) Penthesilia	1903	4
(178) Belisana	1906	3			
			(276) Adelheid	1905	2
(179) Klytæmnestra	1907	3			
			(277) Elvira	1899	3
(182) Elsa	1904	5			
			(278) Paulina	1906	3
(184) Dejopeja	1906	5			
			(287) Nephthys	1896	5
(189) Phthia	1905	6			
			(288) Glauke	1895	2
(190) Ismene	1894	2			
	1897	5	(289) Nenetta	1906	2
	1905	3			
	1906	2	(301) Bavaria	1903	2
(192) Nausikaa	1903	5	(302) Clarissa	1907	3
	1905	6			
	1907	3	(305) Gordonia	1905	6

* Identity uncertain.

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TABLE XIII—Continued.

Asteroid.	Opposition.	Number of Observations.
(306) Unitas	1898	1
	1903	5
(307) Nike	1899	2
(313) Chaldea	1904	5
(317) Roxane	1904	5
(322) Phaeo	1905	5
(324) Bamberga	1903	8
	1906	5
(326) Tamara	1907	4
(332) Siri	1903	5
	1906	5
(333) Badenia	1903	6
	1906	1
(334) Chicago	1901	3
	1903	3
	1904	3
(335) Roberta	1903	3
	1904	3
	1906	5
(339) Dorothea	1903	4
(343) Ostara	1899	3
	1903	4
(344) Desiderata	1905	3
(345) Tercidina	1904	5
	1905	5
(346) Hermentaria	1896	1
(347) Pariana	1906	6
(349) Dembowska	1904	6
(350) Ornamenta	1903	3
(351) Yrsa	1905	4
	1907	4
(356) Liguria	1905	6
	1907	2
(359) Georgia	1906	2
(362) Havnia	1903	5
	1905	4
(364) Isara	1906	6
(371) Bohemia	1903	3
(374) Burgundia	1903	4
	1905	1
	1906	1
(375) Ursula	1907	1
(379) Huenna	1903	4
(381) Myrrha	1903	3
(382) Dodona	1903	3
(386) Siegena	1896	4
	1904	5
	1905	6
(387) Aquitania	1896	2
	1903	3
	1904	4
(388) Charybdis	1904	5
(393) Lampetia	1903	5
(402) Chloe	1903	6
(403) Cyane	1904	5
(405) Thia	1903	4
	1905	3
(406) Erna=[1905 QU]	1905	6
(407) Arachne	1906	4
(409) Aspasia	1903	5
(414) Liriope=[1907 BE]	1907	8
(415) Palatia	1904–1905	9
(417) Suevia	1903	3
(419) Aurelia	1905	3
(420) Bertholda	1903	4
(423) Diotima	1904	2
(426) Hippo	1903	2
(431) Nephele=[1906 UH]	1906	6
(432) Pythia	1903	2
	1904	1
(433) Eros	1898–1899	12
	1907	6
(443) Photographica	1906	4
(444) Gyptis	1905	6
(449) Hamburga	1903	4
(451) Patientia	1904	4
(454) Mathesis	1904	4
(455) Bruchsalia	1904	4
	1905	3
(469) Argentina=[1907 XZ]	1907	10
(470) Kilia	1905	4
(471) Papagena	1907	3
(478) Tergeste	1904	4
	1906	2

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TABLE XIII—Continued.

Asteroid.	Opposition.	Number of Observations.	Asteroid.	Opposition.	Number of Observations.
(483) Seppina	1905	4	(581) Tauntonia *	1907	3
(484) Pittsburghia	1906	2	(588) Achilles	1907	6
(487) Venetia	1905	4	(599) [1906 UJ]*	1906	20
	1907	3		1907	7
(490) Veritas	1903	2	(600) [1906 UM]*	1906	14
				1907	5
(492) Gismonda	1903	2	[1906 VE]*	1906	4
(503) Evelyn	1906	5	[1906 VG]*	1906	5
(504) Cora	1907	2	(611) [1906 VL]*	1906	15
(505) Cava	1907	5	[1906 VM]*	1906	4
(509) Jolanda	1907	4	(622) [1906 WP]*	1906–1907	16
(511) Davida	1905	5			
	1907	1	[1906 WR]*	1906	1
(514) Armida	1906	6	(626) [1907 XO]*	1907	2
[1903 NF]	1903	5	(636) [1907 XP]*	1907	9
(532) Herculina	1904	14	[1907 YC]*	1907	5
	1905	17			
	1906	6	[1907 YD]*	1907	8
(536) Merapi	1904	6	(637) [1907 YE]*	1907	3
	1906	5			
	1907–1908	6	[1907 ZD]*	1907	4
(543) Charlotte	1906	5	[1907 ZP]*	1907	5
(550) Senta	1906	5	(638) [1907 ZQ]*	1907	5
(554) Peraga	1905	7	(645) [1907 AG]*	1907	10
	1906	10			
	1907	7	(653) [1907 BK]*	1907–1908	8
(563) Suleika	1907	5	(655) [1907 BF]*	1907	8
(568) Cheruskia	1907	4			

* Discovered by J. H. Metcalf.

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Table XIV shows the comets observed, the year in which they were observed, and the number of observations in each year.

TABLE XIV.

Comet.	Year.	Number of Observations.	Comet.	Year.	Number of Observations.
1893 IV	1893	2	1900 II	1900	21
1894 II	1894	20	1902 III	1902–1903	45
Encke [1895 I, 1905 I]	1894–1895	9	1903 I	1903	19
	1904	12	1903 II	1902–1903	22
1895 II	1895	13	1903 IV	1903	17
1895 IV	1895	5	1904 I	1904–1905	55
1896 I	1896	10	1904 II	1904–1905	16
Faye [1896 II]	1895–1896	8	1905 II	1904–1905	34
1896 III	1896	8	1905 III	1905	17
1896 V	1896	4	1905 IV	1906	15
Brooks [1896 VI, 1903 V]	1896–1897	24	1905 V	1905	9
	1903–1904	35	1905 VI	1906	9
1896 VII	1896–1897	8	1906 I	1905–1906	10
1897 I	1896	9	1906 II	1906	6
d'Arrest [1897 II]	1897	8	1906 IV	1906	7
1897 III	1897	1	Finlay [1906 V]	1906	7
1898 I	1898	11	1906 VI	1906–1907	9
1898 V	1898	2	1906 VII	1906	12
1898 VI	1898	1	1907 a	1907	9
1898 VII	1898	3	1907 b	1907	5
1898 IX	1898	6	1907 c	1907	2
1898 X	1898	8	1907 d	1907	18
1899 I	1899	1	1907 e	1907	8
1899 V	1899	2			

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V. OBSERVATIONS OF OCCULTATIONS OF STARS BY THE MOON.

The occultations published in the American Ephemeris for observation at Washington have been observed whenever possible with the 12-inch equatorial.

On November 3, 1895, at the time when the Moon passed through the Pleiades, a number of occultations of these stars was observed.

On December 27, 1898, at the time of a lunar eclipse, the occultations of certain stars contained in the Pulkowa circular of October, 1898, were observed with several instruments. The numbers of these stars as published here are the same as those given in this circular.

The observations are printed in chronological order.

VI. OBSERVATIONS OF PHENOMENA OF SATELLITES OF JUPITER AND SATURN.

Under this head are included observations of occultations, transits, and eclipses of the satellites of Jupiter, and eclipses of certain satellites of Saturn in 1907. The phenomena of each satellite are collected and printed in chronological order.

VII. OBSERVATIONS OF MISCELLANEOUS STARS.

This class contains (1) observations of stars for position and (2) physical observations of Nova Persei.

(1) The stars whose positions have been determined are (a) 2387 Geminorum (TURNER'S Nova); (b) certain stars which occur in the Washington A. G. Zones.

(2) The physical observations of Nova Persei consist of estimates of the brightness and a description of the physical aspect of the star.

VIII. OBSERVATIONS OF TRANSITS OF MERCURY.

Two transits of Mercury have been observed at this Observatory, one on November 10, 1894, and the other on November 13, 1907, and are published in this volume.

In answer to a circular letter, observations of the former transit were secured at many different places in this country and the results sent to this Observatory. The reports from these places are published as Appendix II to this volume.

GENERAL REMARKS.

The magnifying powers, as printed with the observations made with the 26-inch equatorial, do not agree with the values given in the table of magnifying powers of the eyepieces of this instrument. (See page A XXIII of this Introduction.) The reason for this is that the observer usually made no note of the exact eyepiece used but only of the approximate power. The power as published is in every case very near the true value.

The seeing has been estimated in two different ways. In the observations of Professor BROWN and Professor SEE it was estimated on a scale of 1 to 5, where 1 signified the poorest and 5 the best seeing. Later the seeing was designated by the letters b, p, f, g, and e, where b=bad; p=poor; f=fair; g=good; and e=excellent.

All of the observations have been thoroughly checked. A number of errors were discovered in the earlier reductions and corrected. These reductions have also been slightly changed by the adoption of a later and better determined value of a revolution of the micrometer screw. This will account for small discrepancies

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between the results published here and those previously published in the astronomical periodicals.

Certain evenings of each week have been devoted to showing celestial objects to visitors. Until October 12, 1897, the public was admitted to the 12-inch equatorial on each Tuesday and Thursday evening. Since that date the time has been limited to Thursday evening of each week. In addition to these regular evenings, special parties are admitted to both the 12-inch and 26-inch equatorials on other evenings by permission from the Superintendent.

With the exception of Plate II, which was furnished through the courtesy of The WARNER and SWASEY Company, the accompanying illustrations are reproductions of photographs taken by Assistant G. H. PETERS.

The reading of the printer's copy and also the proof has been in charge of Assistant ELEANOR A. LAMSON.

Prof. ASAPH HALL, jr., U. S. N., who is at present in charge of the equatorial division, has furnished many suggestions and rendered assistance in various ways in the course of the preparation of the observations for publication.

Personnel.—The following persons have been at one time or another connected with the equatorial division. The official designation of those who have participated in the observing is also given:

Br. = S. J. BROWN, Professor of Mathematics, U. S. N.
F. = EDGAR FRISBY, Professor of Mathematics, U. S. N.
Pl. = H. M. PAUL, Assistant Astronomer; afterwards Professor of Mathematics, U. S. N.
See = T. J. J. SEE, Professor of Mathematics, U. S. N.
Sk. = A. N. SKINNER, Professor of Mathematics, U. S. N.
Ei. = W. S. EICHELBERGER, Professor of Mathematics, U. S. N.
K. = THEO I. KING, Assistant Astronomer.
R. = H. L. RICE, Assistant Astronomer; afterwards Professor of Mathematics, U. S. N.
Hd. = J. C. HAMMOND, Assistant Astronomer.
La. = G. K. LAWTON, Assistant.
P. = G. H. PETERS, Assistant.
Fk. = C. W. FREDERICK, Assistant.
D. = W. W. DINWIDDIE, Assistant.
Fn. = M. FREDERICKSON, Assistant.
A. = GEORGE ANDERSON, Skilled Laborer.
GUSTAVE HARRISON, Skilled Laborer.

Other persons who have made occasional observations, while not officially connected with the equatorial department, are as follows:

SIMON NEWCOMB, Professor of Mathematics, U. S. N.
J. R. EASTMAN, Professor of Mathematics, U. S. N.
U. = MILTON UPDEGRAFF, Professor of Mathematics, U. S. N.
G. A. HILL, Assistant Astronomer.
M. = H. R. MORGAN, Assistant Astronomer.
B. = E. A. BOEGER, Assistant.
Bn. = W. M. BROWN, Assistant.

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SATELLITES OF MARS.

MARS–PHOBOS.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	h m s	″						
Oct. 1	12 59 30	55.43	13 11 30	28.68	4, 6	..	400	Br.	26-inch	Clouds interrupt. Record changed one rev.
1	13 24 0	50.32	.. .. ..	.....	1, .	..	400	Br.	" "	Satellite bright and distinct at first.
6	11 16 30	241.55	11 30 30	28.04	4, 6	3	400	Br.	" "	
6	11 40 30	234.14	.. .. ..	.....	4, .	3	400	Br.	" "	
11	10 15 0	56.04	10 23 0	29.85	4, 6	4	400	Br.	" "	
11	10 30 30	53.14	.. .. ..	.....	4, .	4	400	Br.	" "	
14	11 10 0	232.68	11 21 30	29.39	4, 6	2	400	Br.	" "	Bright Moon, about 4 degrees from Mars.
14	11 33 0	226.78	.. .. ..	.....	4, .	2	400	Br.	" "	
15	9 31 30	241.68	9 43 30	27.36	4, 8	4	400	Br.	" "	
15	9 54 0	235.56	.. .. ..	.....	4, .	4	400	Br.	" "	
15	10 31 0	226.35	10 41 0	26.97	4, 8	4	400	Br.	" "	
15	10 52 0	220.53	.. .. ..	.....	4, .	4	400	Br.	" "	
17	8 11 0	231.03	8 23 0	28.71	4, 8	2	400	Br.	" "	Unsteady and diffuse; satellite faint.
17	8 35 30	223.94	.. .. ..	.....	4, .	2	400	Br.	" "	
18	10 3 0	66.69	10 13 0	25.80	4, 8	4	400	Br.	" "	
18	10 21 0	59.79	.. .. ..	.....	4, .	4	400	Br.	" "	
18	10 55 30	51.99	11 3 30	29.34	4, 8	4	400	Br.	" "	
18	11 11 30	46.79	.. .. ..	.....	4, .	4	400	Br.	" "	
18	11 52 30	33.70	12 3 0	19.06	4, 6	4	400	Br.	" "	
18	12 13 0	20.37	.. .. ..	.....	4, .	4	400	Br.	" "	
19	9 10 30	63.32	9 19 30	27.42	4, 8	4	400	Br.	" "	
19	9 28 30	57.68	.. .. ..	.....	4, .	4	400	Br.	" "	
20	8 4 30	65.39	8 12 30	26.36	4, 8	4	400	Br.	" "	
20	8 19 0	58.75	.. .. ..	.....	4, .	4	400	Br.	" "	
20	9 3 30	47.64	9 13 30	28.23	4, 8	5	400	Br.	" "	
20	9 23 30	42.74	.. .. ..	.....	4, .	5	400	Br.	" "	
20	10 17 0	9.96	.. .. ..	.....	1, .	5	400	Br.	" "	
24	8 29 0	230.62	8 39 30	28.66	4, 8	2	400	Br.	" "	
24	8 49 0	225.18	.. .. ..	.....	4, .	2	400	Br.	" "	
24	9 35 30	206.25	.. .. ..	.....	4, .	2	400	Br.	" "	Satellite disappeared in glare of planet.
31	8 42 0	232.85	8 53 0	27.97	4, 8	3	400	Br.	" "	
31	9 2 30	226.88	.. .. ..	.....	4, .	3	400	Br.	" "	
Nov. 1	11 21 0	55.32	11 32 30	27.95	4, 8	4	400	Br.	" "	
1	11 43 0	49.92	.. .. ..	.....	4, .	4	400	Br.	" "	
22	8 54 42	231.26	9 13 30	22.05	3, 4	2	400	Br.	" "	Satellite very faint.
1896										
Dec. 9	10 35 30	58.35	10 52 0	19.40	4, 3	..	400	Br.	26-inch	
11	8 46 30	56.29	8 57 0	17.13	4, 4	4	400	Br.	" "	
11	11 29 48	238.26	11 40 30	22.79	3, 4	5	400	Br.	" "	
11	.. .. ..	.....	12 2 0	22.66	., 4	5	400	Br.	" "	
16	10 0 48	59.72	10 14 0	21.15	4, 4	2	400	Br.	" "	
16	10 26 24	59.22	10 41 48	21.67	4, 3	2	400	Br.	" "	
28	9 55 36	231.40	10 6 12	17.25	4, 4	..	400	Br.	" "	
1903										
Mar. 26	11 23 11	301.63	11 34 16	19.82	5, 10	..	400	Fk.	26-inch	Very difficult.
26	11 46 22	311.68	.. .. ..	.....	4, .	..	400	Fk.	" "	Very difficult.

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SATELLITES OF MARS—Continued.

MARS–PHOBOS—Continued.

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha \cos\delta$	WASHINGTON MEAN TIME.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	"	h m s	"						
June 21	12 46 21	−26.95	12 46 52	+ 9.16	4,4	g	400	R.	26-inch	Images steady; satellite faint, measures good; $\Delta\alpha$ better than $\Delta\delta$.
21	13 15 28	−27.60	13 15 26	+ 8.11	4,4	g	400	R.	" "	Thick; measures not so good as preceding.
30	11 8 26	−28.44	11 8 2	+ 9.99	4,4	..	400	R.	" "	Sky clear, but seeing unsteady; satellite fairly bright.
30	11 36 40	−29.08	11 36 8	+ 9.34	4,4	..	400	R.	" "	Unsteady.
30	14 35 57	+25.53	14 42 59	− 9.72	2,4	..	400	R.	" "	Poor observation; bright moonlight.
July 3	12 7 56	+29.61	12 7 28	−10.28	4,4	p	400	R.	" "	Very unsteady and diffuse.
3	12 29 39	+28.45	12 29 47	− 8.94	4,4	p	400	R.	" "	Very unsteady and diffuse.
5	13 55 8	−29.27	13 55 2	+10.46	4,4	..	400	R.	" "	Thick; seeing steady. Fairly good observation.
14	12 1 43	−29.74	12 2 26	+11.74	4,4	p	400	R.	" "	
14	12 26 22	−28.38	12 28 16	+11.21	4,4	p–f	400	R.	" "	
16	10 32 58	−26.93	10 32 24	+10.23	4,4	f	400	R.	" "	
21	12 2 6	−26.84	12 2 6	+11.38	4,4	g	400	R.	" "	
21	12 24 30	−28.40	12 24 42	+12.16	5,4	..	400	R.	" "	
31	10 11 1	−25.35	10 11 30	+10.81	4,4	f	400	R.	" "	Seeing poorer than for preceding measures.

MARS–DEIMOS.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	h m s	"						
Oct. 1	11 47 0	231.72	11 47 0	74.10	8,8	..	400	Br.	26-inch	Faint and difficult.
6	10 47 36	239.46	10 47 30	69.29	8,6	3	400	Br.	" "	
10	9 37 30	223.95	9 37 12	70.33	8,8	2	400	Br.	" "	Hazy; satellite very faint.
11	10 52 42	244.00	10 52 0	62.49	8,6	4	400	Br.	" "	
15	9 14 48	229.73	9 15 0	74.22	8,6	4	400	Br.	" "	
15	11 38 12	218.91	11 39 0	63.00	8,8	4	400	Br.	" "	
15	13 38 54	203.17	13 35 30	44.66	9,8	3	400	Br.	" "	
16	10 50 48	252.41	10 51 30	52.05	8,6	2	400	Br.	" "	Satellite faint, visible only at times.
17	9 10 30	38.00	9 13 12	61.51	8,6	2	400	Br.	" "	
17	10 36 12	27.29	10 35 0	49.30	8,6	3	400	Br.	" "	Images better than at time of preceding measure.
18	9 31 48	64.13	9 33 0	63.30	8,6	3	400	Br.	" "	
18	11 34 24	54.80	11 35 30	73.58	8,6	4	400	Br.	" "	
18	12 45 0	49.72	12 48 0	74.26	8,6	4	400	Br.	" "	
19	8 49 30	198.29	8 51 0	39.73	8,8	4	400	Br.	" "	
19	10 1 18	175.12	10 1 30	28.92	8,8	4	400	Br.	" "	
20	8 38 18	236.54	8 38 48	73.16	8,6	5	400	Br.	" "	
20	10 33 36	228.73	10 35 30	73.09	8,6	5	400	Br.	" "	
24	9 6 48	206.67	9 7 30	47.41	8,8	2	400	Br.	" "	
25	8 37 6	242.06	8 37 30	66.39	8,6	2	400	Br.	" "	
27	10 5 0	44.37	.. .. ..	.....	4,0	1	400	Br.	" "	Clouded over.
31	8 9 6	19.68	8 11 0	39.90	7,4	2	400	Br.	" "	
Nov. 1	7 41 30	60.01	7 43 0	66.55	8,6	3	400	Br.	" "	
1	9 3 12	53.58	9 4 0	69.87	8,6	3	400	Br.	" "	
1	10 26 48	47.18	10 27 30	67.84	8,6	3	400	Br.	" "	
1	12 1 12	39.32	12 1 0	60.31	8,6	4	400	Br	" "	

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SATELLITES OF MARS—Continued.

MARS–DEIMOS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	h m s	″						
Nov. 6	10 0 12	54.83	9 59 0	66.17	10, 6	3	400	Br.	26 inch	
6	11 12 30	48.68	11 12 0	65.81	9, 6	3	400	Br.	" "	
6	12 56 36	40.57	12 53 30	58.16	10, 6	3	400	Br.	" "	Satellite very faint at the end.
15	8 12 48	42.71	8 20 0	57.99	5, 6	1	400	Br.	" "	Almost invisible.
20	8 16 30	50.07	8 33 42	56.70	7, 3	2	400	Br.	" "	
22	8 11 12	215.55	8 33 48	45.72	4, 5	2	400	Br.	" "	Almost invisible.
1896										
Nov. 18	12 16 12	239.43	12 38 12	52.37	3, 2	..	400	Br.	26-inch	
22	9 32 0	241.60	9 51 12	55.79	3, 3	..	400	Br.	" "	
22	10 22 36	241.91	10 29 24	54.09	4, 3	..	400	Br.	" "	
22	11 0 0	241.87	11 10 36	51.68	4, 4	..	400	Br.	" "	
22	11 59 30	241.70	12 21 42	44.03	4, 3	..	400	Br.	" "	
22	13 2 6	242.48	12 45 18	40.93	3, 3	..	400	Br.	" "	
22	.. .. ..	.....	13 23 30	35.61	., 2	..	400	Br.	" "	
25	10 2 12	60.88	10 25 0	50.31	3, 5	..	400	Br.	" "	Thick.
Dec. 9	11 15 30	57.82	11 3 48	55.75	4, 4	..	400	Br.	" "	
9	12 14 12	56.22	12 27 0	48.12	4, 4	..	400	Br.	" "	
9	12 45 30	56.99	.. .. ..	.....	4, .	..	400	Br.	" "	
11	9 15 48	236.86	9 23 0	51.54	3, 3	5	400	Br.	" "	
11	10 30 30	235.51	10 41 12	43.41	4, 4	5	400	Br.	" "	
11	11 25 48	234.98	11 15 12	37.16	3, 4	5	600	Br.	" "	
11	.. .. ..	.....	12 14 0	27.85	., 4	5	400	Br.	" "	Phobos more than twice as bright as Deimos.
14	9 39 48	58.26	9 54 30	56.13	4, 4	3	400	Br.	" "	
16	7 59 0	237.69	8 16 0	55.54	4, 5	2	400	Br.	" "	
16	9 29 12	235.92	9 41 30	52.48	4, 4	2	400	Br.	" "	
16	11 10 0	234.78	11 21 30	44.55	4, 4	2	400	Br.	" "	
23	8 20 30	54.73	8 38 12	50.90	4, 4	..	400	Br.	" "	
23	9 30 0	53.45	9 18 0	47.08	4, 4	..	400	Br.	" "	
28	7 52 36	56.08	8 12 36	52.72	3, 5	..	400	Br.	" "	Faint.
28	8 30 0	54.76	8 42 12	51.76	4, 4	..	400	Br.	" "	Satellite brighter than at first.
28	9 48 6	53.12	9 39 24	48.85	4, 4	..	400	Br.	" "	Satellite brighter than at first.
1903										
Mar. 25	13 49 22	307.14	13 47 52	49.31	10, 10	p	...	Fk.	26-inch	
1905										
May 12	12 18 9	303.70	12 27 53	56.86	4, 4	f	400	R.	26-inch	Unsteady. Phobos invisible.
24	11 46 59	122.46	11 46 36	54.02	8, 7	p	400	R.	" "	Fair observation.
		$\Delta\alpha \cos\delta$		$\Delta\delta$						
1907		″		″						
June 19	12 48 38	−48.71	12 47 40	+ 4.73	4, 4	f	400	R.	26-inch	Thick; images steady; fairly good measures.
30	13 11 47	−48.04	13 11 39	+21.45	4, 4	..	400	R.	" "	Moonlight; fairly steady; satellite fairly bright.
30	14 4 26	−57.24	14 4 29	+22.77	4, 4	..	400	R.	" "	Bright moonlight; measures not so good as preceding.
July 4	12 5 49	−75.72	12 1 36	+23.40	4, 4	p	400	R.	" "	Clouds interrupt.
4	12 56 57	−74.44	12 57 32	+21.80	4, 4	p	400	R.	" "	Measures slightly better than preceding.
5	14 7 22	−46.06	14 6 24	+22.09	4, 4	..	400	R.	" "	Thick; satellite very faint; poor observation.
14	11 16 50	−60.70	11 16 34	+24.54	4, 4	f	400	R.	" "	Fairly steady.
16	10 47 0	+73.63	10 46 48	−26.07	4, 4	f	400	R.	" "	
16	11 44 57	+75.26	11 45 36	−25.19	4, 4	f	400	R.	" "	Thick; images fairly steady.
21	11 12 36	+69.62	11 12 48	−25.64	4, 4	g	400	R.	" "	Bright moonlight.
21	12 37 10	+74.17	12 37 5	−25.51	4, 4	f	400	R.	" "	Satellite very faint.
30	10 5 54	+67.82	10 5 22	−22.97	4, 4	p	400	R.	" "	Thick; images unsteady.

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SATELLITES OF JUPITER.

I–II.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	"						
June 10	14 54 0	71.78	14 56 18	50.42	8, 8	g	115	K.	12-inch	
Aug. 16	11 3 21	72.21	11 4 9	95.48	6, 6	p	335	K.	" "	
18	11 39 32	73.08	11 40 29	36.84	8, 6	g	335	K.	" "	
19	10 44 16	71.53	10 45 2	141.12	8, 6	f	335	K.	" "	
Oct. 15	6 31 18	72.37	6 31 50	74.04	8, 6	g	235	K.	" "	
1903										
June 30	15 59 11	245.14	15 59 1	264.96	6, 4	..	235	K.	12-inch	
July 20	15 11 16	230.17	15 11 58	19.31	6, 4	..	335	K.	" "	
20	15 30 56	229.47	15 32 0	17.75	6, 4	..	335	K.	" "	
24	15 29 15	169.18	15 29 26	6.68	6, 4	g	335	K.	" "	
Aug. 11	15 8 6	239.91	15 8 49	102.61	6, 4	..	115	K.	" "	
17	13 18 40	72.90	13 18 24	49.46	6, 4	..	335	K.	" "	
21	12 6 13	74.10	12 6 33	27.83	6, 4	f	335	K.	" "	Unsteady.
24	12 28 24	68.96	12 28 54	90.83	6, 4	f	335	K.	" "	Unsteady.
Sept. 22	10 53 18	67.88	10 54 8	83.18	6, 4	g	235	K.	" "	Unsteady.
25	9 13 8	68.04	9 13 30	89.96	6, 4	g	235	K.	" "	
29	12 36 31	67.80	12 37 0	68.15	6, 4	p	335	K.	" "	Unsteady.
Oct. 2	10 38 34	67.58	10 39 8	95.25	6, 4	p	235	K.	" "	Unsteady.
6	8 50 4	67.98	8 50 18	68.02	6, 4	p	235	K.	" "	Definition poor; unsteady.
12	10 54 38	64.23	10 55 9	258.30	6, 4	p	235	K.	" "	
13	11 35 9	67.52	11 35 36	78.85	6, 4	p	235	K.	" "	Unsteady and diffuse.
20	8 59 35	67.73	8 59 55	67.01	6, 4	f	235	K.	" "	Unsteady and ill-defined.
27	8 51 50	67.19	8 52 19	71.75	6, 4	g	235	K.	" "	Poor definition.
28	11 4 9	234.75	11 4 34	55.64	6, 4	f	235	K.	" "	
Nov. 3	7 33 16	66.54	7 34 0	86.63	6, 4	e	235	K.	" "	
3	9 38 54	66.86	9 39 11	75.73	6, 4	g	235	K.	" "	
4	9 16 11	76.17	9 16 14	45.69	6, 4	g	235	K.	" "	Very thick, but steady and distinct.
7	7 28 40	66.31	7 28 58	108.58	6, 4	g	235	K.	" "	Clock drives unsteadily.
9	8 9 10	47.93	8 9 16	36.51	6, 4	g	235	K.	" "	Steady and well-defined.
10	8 23 55	66.18	8 24 5	92.74	6, 4	g	235	K.	" "	Clock drives unsteadily.
22	7 7 15	237.70	7 7 45	68.71	6, 6	g	160	Hd.	" "	
25	6 26 3	66.65	6 26 24	153.56	6, 6	g	160	Hd.	" "	Through clouds.
28	7 9 27	65.83	7 9 51	79.89	6, 6	g	160	Hd.	" "	Through clouds.
30	6 43 33	247.31	6 44 23	195.36	6, 6	g	160	Hd.	" "	
Dec. 5	6 36 21	65.19	6 36 37	73.93	6, 6	p	160	Hd.	" "	Unsteady and woolly.
6	6 46 16	73.20	6 46 29	58.81	6, 6	g	160	Hd.	" "	
7	6 29 21	246.46	6 29 39	245.45	6, 6	f	160	Hd.	" "	A little unsteady.
14	6 58 44	245.90	6 59 1	268.02	6, 6	g	160	Hd.	" "	
15	6 38 43	63.75	6 39 20	145.71	6, 6	f	335	Hd.	" "	
20	7 0 52	63.34	7 1 6	151.09	6, 6	p	160	Hd.	" "	Too unsteady for good measures.
22	7 10 41	63.20	7 10 49	134.49	6, 6	g	160	Hd.	" "	
23	6 22 38	64.75	6 22 59	117.64	6, 6	..	160	Hd.	" "	Unsteady.
30	6 32 18	64.79	6 32 33	101.39	6, 6	g	235	Hd.	" "	Very thick.
31	6 32 28	231.59	6 32 28	38.55	6, 6	g	235	Hd.	" "	
1904										
Jan. 3	7 5 38	66.08	7 6 9	180.25	6, 6	f	235	Hd.	12-inch	
Sept. 4	10 45 43	77.29	10 45 46	92.14	8, 8	p	235	R.	" "	
7	12 51 52	68.76	12 52 9	319.52	8, 8	g	160	R.	" "	
11	10 37 10	73.61	10 37 13	145.44	8, 8	g	235	R.	" "	
15	10 27 16	234.60	10 27 22	40.81	8, 8	f	235	R.	" "	
16	11 22 27	245.15	11 22 42	154.11	8, 8	f	235	R.	" "	
21	17 12 4	68.48	17 12 31	316.78	8, 8	g–f	160	R.	" "	
22	11 41 28	228.97	11 41 53	30.25	8, 8	g	115	R.	" "	

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SATELLITES OF JUPITER—Continued.

I–II—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	″						
Sept. 23	11 30 21	243.68	11 30 25	121.91	8, 8	g	160	R.	12-inch	
26	11 31 28	201.15	11 31 18	9.07	8, 8	p	235	R.	" "	Clouds.
Oct. 1	11 22 42	255.68	11 22 41	148.49	8, 8	f	160	R.	" "	
3	11 31 25	182.69	11 31 25	6.96	8, 8	p	235	R.	" "	Seeing miserable; too poor to continue.
4	10 11 28	246.97	10 11 44	288.93	8, 8	p	235	R.	" "	
7	11 10 34	234.80	11 10 23	44.81	8, 8	p	235	R.	" "	
10	9 15 59	217.47	9 16 15	13.16	8, 8	p	235	R.	" "	Unsteady.
14	11 15 56	214.35	11 15 49	17.34	8, 8	p	235	R.	" "	
15	9 30 38	249.66	9 30 19	302.63	8, 8	p	160	R.	" "	
16	10 13 56	67.33	10 14 0	325.97	8, 8	g	115	R.	" "	
17	8 51 26	202.78	8 51 42	10.53	8, 8	g	235	R.	" "	Fine measures.
18	8 35 27	244.20	8 35 3	183.08	8, 8	g	160	R.	" "	
19	10 47 18	55.39	10 47 46	102.44	8, 8	f	235	R.	" "	
21	10 22 14	92.49	10 22 33	20.07	8, 8	p	235	R.	" "	Unsteady.
22	9 19 29	248.53	9 19 36	330.03	8, 8	p	160	R.	" "	Unsteady and woolly.
24	9 23 22	152.95	9 23 30	8.01	8, 8	f–g	235	R.	" "	
27	15 7 43	76.62	15 7 57	65.55	8, 8	g–f	235	R.	" "	
Nov. 1	8 40 10	239.95	8 40 5	94.10	8, 8	p	235	R.	" "	
5	8 5 11	246.57	8 4 54	321.17	8, 8	..	160	R.	" "	Unsteady.
7	7 44 34	79.12	7 44 52	44.71	8, 8	f–g	235	R.	" "	
9	11 50 42	260.79	11 50 38	86.00	8, 8	g	235	R.	" "	Hazy.
14	13 1 16	83.07	.. .. ..	.....	8, .	p	235	R.	" "	
15	10 38 12	232.55	10 38 12	47.94	8, 8	e	235	R.	" "	
19	10 35 52	245.76	10 35 17	301.13	8, 8	g	160	R.	" "	
21	7 26 46	71.58	7 27 4	103.51	8, 8	..	235	R.	" "	Unsteady and diffuse.
28	9 4 38	71.00	9 4 44	106.44	8, 8	p	235	R.	" "	Unsteady.
30	11 23 11	248.97	11 22 56	275.21	8, 8	f	160	R.	" "	
Dec. 16	8 45 2	72.03	8 45 34	51.92	8, 8	g	235	R.	" "	
20	8 49 56	69.67	8 50 4	96.81	8, 8	p	160	R.	" "	
30	7 43 43	70.23	7 43 23	78.37	8, 8	p	235	R.	" "	Very unsteady and woolly.
1905										
Oct. 11	11 39 2	251.57	11 38 46	74.85	8, 8	f	115	R.	12-inch	
Nov. 2	10 42 46	255.27	10 42 34	46.40	8, 8	f	160	R.	" "	
4	10 17 25	79.34	10 17 27	347.39	8, 8	f	160	R.	" "	
8	10 39 53	85.59	10 39 56	129.20	8, 8	f	160	R.	" "	Unsteady.
10	14 44 44	262.73	14 44 35	215.69	8, 8	f	115	R.	" "	
11	10 10 59	78.32	10 10 54	342.64	8, 8	p	115	R.	" "	Unsteady and diffuse.
14	10 16 36	327.31	10 16 36	21.26	8, 6	g	235	R.	" "	Good measures.
Dec. 4	9 31 12	249.12	9 31 18	41.93	8, 8	f–g	235	R.	" "	Good measures.
5	8 46 28	260.90	8 46 5	242.07	8, 8	g	235	R.	" "	
6	12 43 8	79.60	12 43 43	258.70	8, 8	g	160	R.	" "	
11	9 20 56	240.07	9 20 58	19.42	8, 8	f–g	235	R.	" "	Seeing improves.
12	8 48 31	259.51	8 48 27	278.12	8, 8	f–g	160	R.	" "	
19	8 17 55	258.17	8 17 51	303.94	8, 8	f	160	R.	" "	Images tremble somewhat.
30	8 0 32	265.13	8 0 33	116.45	8, 8	p	235	R.	" "	Unsteady.
1906										
Jan. 5	8 3 13	247.47	8 2 57	52.07	8, 8	f	235	R.	12-inch	
6	7 41 24	261.06	7 41 14	187.01	8, 9	f	235	R.	" "	
9	7 25 48	255.53	7 26 33	261.17	9, 8	f–p	115	R.	" "	Unsteady.
29	9 7 32	86.31	9 7 21	24.85	8, 8	f–g	235	R.	" "	
Feb. 9	9 56 9	81.05	9 55 41	62.63	8, 8	f–p	160	R.	" "	Seeing becomes poorer.

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SATELLITES OF JUPITER—Continued.

I–III.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	"						
May 29	15 57 23	72.52	15 59 22	24.14	8, 8	g	115	K	12-inch	
July 22	12 21 38	70.96	12 21 52	74.31	8, 8	f	115	K.	" "	
28	12 3 19	69.85	12 4 11	5.20	6, 5	p	335	K.	" "	Sat. I transits III and is perceptibly brighter.
Oct. 31	8 11 56	72.78	8 13 9	169.74	6, 6	g	235	K.	" "	
1903										
May 8	16 52 45	243.29	16 53 1	217.74	6, 4	g	115	K.	12-inch	
June 2	15 57 48	273.46	15 56 18	24.87	6, 4	e	335	K.	" "	
10	16 31 54	64.15	16 32 11	346.60	6, 4	..	115	K.	" "	
14	16 16 36	243.78	16 17 5	380.13	6, 4	..	115	K.	" "	
July 8	15 51 53	61.78	15 52 1	255.94	6, 4	..	235	K.	" "	
19	15 53 2	238.67	15 54 25	130.82	6, 4	..	115	K.	" "	
Sept. 21	9 4 50	174.46	9 5 7	18.30	6, 4	p	335	K.	" "	Unsteady; position angle changes rapidly.
24	10 28 26	38.27	10 28 44	33.39	6, 4	..	235	K.	" "	Not well-defined; unsteady.
25	9 1 4	57.68	9 1 43	68.91	6, 4	g	235	K.	" "	
Oct. 2	10 27 4	55.15	10 28 5	49.47	6, 4	p	235	K.	" "	Unsteady and ill-defined.
12	11 7 1	70.56	11 7 28	149.68	6, 6	p	235	K.	" "	
Nov. 6	8 19 48	301.83	8 20 3	6.21	6, 4	p	235	K.	" "	Unsteady and diffuse but fairly good observation.
25	6 38 47	243.00	6 38 47	119.50	6, 6	g	160	Hd.	" "	Clouds.
27	7 37 11	250.55	7 37 38	68.67	6, 6	p	160	Hd.	" "	Very unsteady; images woolly.
29	7 4 42	64.78	7 5 19	355.99	6, 6	g	160	Hd.	" "	
30	6 57 3	65.01	6 57 21	251.36	6, 6	g	160	Hd.	" "	
Dec. 7	6 41 16	64.62	6 41 52	224.96	6, 6	..	160	Hd.	" "	A trifle unsteady.
11	7 7 45	247.51	7 7 40	144.35	6, 6	g	160	Hd.	" "	
13	5 20 14	63.81	5 20 56	314.99	6, 6	..	235	Hd.	" "	Very unsteady and woolly.
14	6 35 59	64.47	6 36 23	201.30	6, 6	g	160	Hd.	" "	
15	7 2 31	67.48	7 2 56	223.39	6, 6	f	160	Hd.	" "	
18	6 32 5	246.70	6 32 21	194.64	6, 6	g	235	Hd.	" "	
22	6 36 49	66.50	6 37 1	287.51	6, 6	g	160	Hd.	" "	
23	6 33 32	240.60	6 33 48	76.26	6, 6	..	160	Hd.	" "	Unsteady.
28	4 36 23	64.08	4 36 47	163.81	6, 6	..	160	Hd.	" "	Daylight illumination.
31	6 54 34	241.89	6 54 36	180.10	6, 6	g	235	Hd.	" "	
1904										
Jan. 3	7 17 28	61.84	7 17 30	186.26	6, 6	f	235	Hd.	12-inch	
4	7 18 0	63.72	7 18 16	153.43	6, 6	g	235	Hd.	" "	
Sept. 4	11 34 42	68.15	11 34 54	234.51	8, 8	p	235	R.	" "	
7	12 17 45	240.64	12 17 11	146.84	8, 8	g	160	R.	" "	
11	10 56 44	67.65	10 56 57	259.25	8, 8	g	235	R.	" "	
15	10 2 42	248.16	10 2 28	487.11	8, 8	f	160	R.	" "	Measures of distance poor.
16	11 2 56	251.05	11 3 13	163.00	8, 8	f	235	R.	" "	
21	13 38 59	232.81	13 39 38	78.00	8, 8	p	235	R.	" "	
22	11 23 5	247.83	11 23 33	494.23	8, 8	g	115	R.	" "	
23	11 16 24	250.64	11 16 32	170.98	8, 8	g	160	R.	" "	
26	11 10 38	67.38	11 10 44	420.29	8, 8	f–p	115	R.	" "	
27	10 17 24	84 32	10 17 59	88.23	8, 8	f	235	R.	" "	Clouds.
Oct. 1	10 30 35	258.66	10 30 48	143.92	8, 8	g–p	160	R.	" "	Seeing getting poorer.
4	9 52 11	76.08	9 52 35	168.63	8, 8	p	235	R.	" "	
7	10 32 11	249.83	10 31 26	188.39	8, 8	g	160	R.	" "	
10	9 36 19	65.60	9 36 49	325.99	8, 8	p	160	R.	" "	Unsteady.
14	10 47 35	249.41	10 48 5	203.73	8, 8	p	160	R.	" "	
15	9 48 59	251.68	9 49 22	282.33	8, 8	p	160	R.	" "	
16	10 26 6	64.70	10 26 10	300.23	8, 8	g	115	R.	" "	
17	9 9 19	64.87	9 9 15	276.17	8, 8	g	160	R.	" "	Fine measures.
18	8 53 34	70.77	8 53 57	335.25	8, 8	g	160	R.	" "	
19	11 21 2	83.20	11 21 11	53.15	8, 8	f	235	R.	" "	Clouded over completely after observation.
21	10 41 6	248.87	10 40 59	223.65	8, 8	p	235	R.	" "	Unsteady.

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SATELLITES OF JUPITER—Continued.

I–III—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	"						
Oct. 22	9 37 46	250.24	9 38 4	325.66	8, 8	p	160	R.	12-inch	Unsteady and woolly.
24	8 59 50	64.09	9 0 0	234.74	8, 8	g	160	R.	" "	
27	14 36 46	244.83	14 37 34	432.30	8, 8	g	160	R.	" "	
31	9 3 55	63.17	9 3 59	198.78	8, 8	g	160	R.	" "	
Nov. 3	7 18 53	237.80	7 18 47	166.29	8, 8	p	160	R.	" "	Thick.
5	8 24 40	248.15	8 24 1	363.26	8, 10	f	160	R.	" "	
6	12 38 24	62.20	12 38 19	229.97	8, 8	f–g	160	R.	" "	
7	8 1 43	62.24	8 1 50	156.05	8, 8	f–g	235	R.	" "	Rather unsteady.
9	11 38 13	75.66	11 38 21	75.72	8, 8	g	235	R.	" "	Hazy.
15	10 14 26	67.51	10 14 12	478.64	8, 8	g	115	R.	" "	
16	10 53 25	75.25	10 52 45	76.96	8, 8	g	235	R.	" "	
19	10 14 29	247.19	10 15 2	366.96	8, 8	g	160	R.	" "	Steady.
21	7 41 23	60.76	7 41 9	112.72	8, 8	..	235	R.	" "	Unsteady and diffuse.
28	9 19 30	59.52	9 19 44	93.76	8, 8	p	235	R.	" "	Unsteady.
30	11 35 50	72.30	11 35 42	101.30	8, 8	f	160	R.	" "	
Dec. 14	5 52 54	69.42	5 53 18	217.38	8, 8	g	235	R.	" "	
16	8 26 17	244.42	8 25 49	335.28	8, 8	g	115	R.	" "	
20	8 35 8	64.01	8 35 2	345.97	8, 8	p	160	R.	" "	Strong wind.
30	7 6 40	242.07	7 6 26	230.80	8, 8	f	160	R.	" "	
1905										
Oct. 11	12 8 6	81.43	12 9 9	195.42	8, 8	f	115	R.	12-inch	Observation difficult because of high altitude of Jupiter.
Nov. 4	9 59 47	253.40	9 59 57	151.25	8, 8	f	160	R.	" "	
8	11 27 40	79.47	11 28 2	272.68	8, 10	f	160	R.	" "	
10	15 6 32	252.60	15 6 29	169.05	8, 8	f	160	R.	" "	
11	10 54 54	251.77	10 54 44	127.61	8, 8	p	160	R.	" "	Unsteady.
14	9 32 17	50.27	9 32 23	58.63	8, 8	e	235	R.	" "	Steady; good measures.
21	9 36 41	311.51	9 36 18	34.67	8, 8	f–p	235	R.	" "	Unsteady.
25	11 17 55	245.57	11 17 37	69.18	8, 8	f	235	R.	" "	
Dec. 4	8 55 50	261.87	8 55 59	158.02	8, 8	f–g	235	R.	" "	Good measures.
5	9 5 20	265.72	9 5 44	167.50	8, 8	g	235	R.	" "	
11	8 44 5	260.77	8 43 55	187.43	8, 8	f	160	R.	" "	Thin clouds; unsteady.
12	8 30 42	262.33	8 30 51	226.04	8, 8	f	160	R.	" "	
18	8 50 38	259.80	8 50 22	216.69	8, 9	f	160	R.	" "	Clouds interrupt.
19	8 34 48	260.68	8 34 55	260.25	8, 8	f	160	R.	" "	
30	8 13 10	219.08	8 13 20	20.45	8, 8	p	235	R.	" "	
1906										
Jan. 5	7 30 33	77.69	7 30 43	438.60	8, 8	f	115	R.	12-inch	
9	7 42 53	257.71	7 42 38	290.72	8, 8	f–p	115	R.	" "	High wind; unsteady.
10	5 58 25	61.44	5 58 27	93.85	8, 8	f	235	R.	" "	
18	5 39 1	73.46	5 38 59	149.02	8, 8	p	160	R	" "	Unsteady.
29	9 50 18	256.04	9 50 17	346.28	8, 8	g	160	R.	" "	
30	8 44 3	256.41	8 44 10	258.11	8, 8	g	115	R.	" "	Hazy.
Feb. 9	9 11 26	75.30	9 11 20	384.60	8, 8	g–f	160	R.	" "	

I–IV.

1902										
June 17	14 38 11	70.68	14 39 15	369.67	8, 8	f	115	K.	12-inch	
Aug. 4	11 55 0	69.88	11 55 50	82.52	8, 8	g	235	K.	" "	Good observation.
Sept. 6	10 36 27	71.56	10 37 23	105.98	10, 6	g	115	K.	" "	The identity of this pair doubtful, names omitted and supplied afterwards.
1903										
June 2	16 36 31	239.87	16 36 31	119.33	6, 4	f	335	K.	12-inch	
10	16 5 46	53.50	16 6 1	51.73	6, 4	..	335	K.	" "	
Aug. 17	13 36 53	53.01	13 37 30	82.63	6, 4	..	335	K.	" "	
24	12 14 17	162.53	12 14 2	22.08	6, 4	f	335	K.	" "	Unsteady; through clouds.
Sept. 25	12 21 10	68.47	12 21 41	238.85	6, 4	g	115	K.	" "	
Oct. 6	9 0 49	57.76	9 1 13	150.56	6, 4	f	235	K.	" "	Hazy.

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SATELLITES OF JUPITER—Continued.

I–IV—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	h m s	″						
Oct. 13	11 24 12	121.41	11 24 20	15.34	6,4	p	235	K.	12-inch	
21	8 51 36	256.18	8 52 4	64.42	6,4	g	235	K.	" "	
Dec. 3	6 26 59	240.36	6 27 47	173.29	6,6	..	335	Hd.	" "	Unsteady.
5	6 49 15	244.35	6 49 45	543.73	6,6	..	160	Hd.	" "	Unsteady and woolly.
6	7 11 55	244.63	7 12 13	414.17	6,6	g	160	Hd.	" "	
11	6 55 55	58.76	6 56 27	126.25	6,6	g	160	Hd.	" "	
14	7 10 24	64.25	7 10 48	395.22	6,6	g	160	Hd.	" "	
18	6 42 40	66.50	6 43 8	323.83	6,6	g	160	Hd.	" "	
22	6 48 36	243.61	6 49 15	344.42	6,6	g	160	Hd.	" "	
28	4 45 35	254.25	4 45 49	63.94	6,6	..	160	Hd.	" "	Daylight illumination.
1904										
Jan. 4	6 55 1	71.73	6 55 17	96.88	6,6	g	235	Hd.	12-inch	

II–III.

1902										
Aug. 2	11 24 19	71.59	11 26 32	384.39	8,6	f	160	K.	12-inch	
8	11 21 52	70.89	11 23 14	99.92	8,6	g	335	K.	" "	Good observation.
25	11 0 44	72.10	11 0 48	157.53	6,6	e	160	K.	" "	
Dec. 9	5 24 7	72.62	5 24 20	43.30	6,6	f	235	K.	" "	
1903										
May 22	16 34 22	72.70	16 34 23	90.99	6,4	..	235	K.	12-inch	
28	16 22 1	64.45	16 22 30	314.46	6,4	..	235	K.	" "	
June 10	16 18 14	61.38	16 18 39	72.14	6,4	..	335	K.	" "	
14	16 25 2	244.94	16 27 54	447.53	3,4	..	115	K.	" "	Clouds interrupt.
30	15 41 50	60.22	15 43 9	68.84	6,4	..	335	K.	" "	
July 8	15 36 30	51.32	15 36 30	16.20	6,4	..	335	K.	" "	
21	15 0 5	273.16	15 0 26	16.55	6,4	..	335	K.	" "	
Aug. 11	14 53 2	249.07	14 52 48	127.88	6,4	..	115	K.	" "	
Sept. 23	10 41 37	247.66	10 41 50	103.05	6,4	..	235	K.	" "	Thick haze; seeing steady and
25	9 29 31	284.13	9 29 55	21.62	6,4	g	235	K.	" "	definition good.
Oct. 2	10 50 17	262.10	10 50 40	45.32	6,4	p	235	K.	" "	Unsteady.
12	10 40 34	234.55	10 40 47	100.12	6,4	p	235	K.	" "	
19	9 13 19	108.21	9 13 33	28.03	6,4	f	235	K.	" "	Unsteady.
26	10 6 15	78.64	10 6 41	76.45	6,4	f	235	K.	" "	Unsteady; clouds.
Nov. 7	6 57 55	48.85	6 58 11	51.55	6,4	g	235	K.	" "	
24	6 55 59	239.15	6 56 30	122.43	6,6	..	115	Hd.	" "	Unsteady.
29	7 13 41	63.40	7 18 10	365.66	3,5	g	160	Hd.	" "	Through clouds.
Dec. 1	6 53 4	231.78	6 52 59	55.10	7,6	g	160	Hd.	" "	
6	6 58 43	62.65	6 59 8	293.75	6,6	g	160	Hd.	" "	
11	7 19 17	244.41	7 19 43	196.53	6,6	g	160	Hd.	" "	
15	6 50 10	73.51	6 50 20	85.01	6,6	f	335	Hd.	" "	
17	6 34 33	245.08	6 34 42	130.92	6,6	p	160	Hd.	" "	
18	6 22 50	244.04	6 23 17	175.60	6,6	g	235	Hd.	" "	
20	6 35 55	59.11	6 36 19	140.27	6,6	p	160	Hd.	" "	
22	7 1 3	69.73	7 1 18	145.96	6,6	g	160	Hd.	" "	
31	6 43 2	244.74	6 43 20	133.35	6,6	g	235	Hd.	" "	
1904										
Sept. 2	11 27 42	55.69	11 28 16	62.57	8,8	f	115	R.	12-inch	
4	11 9 34	62.80	11 10 18	157.92	8,8	p	235	R.	" "	
7	13 32 0	246.36	13 31 24	485.13	8,8	g	115	R.	" "	
10	10 20 47	60.48	10 21 9	53.80	8,8	p	235	R.	" "	
11	10 0 10	60.05	10 0 47	112.94	8,8	g	235	R.	" "	
15	10 50 6	249.55	10 50 4	438.20	8,8	f	115	R.	" "	
16	10 46 33	288.84	10 46 50	25.23	8,8	f	235	R.	" "	
21	17 37 9	245.73	17 37 52	475.92	8,8	g–f	115	R.	" "	

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SATELLITES OF JUPITER—Continued.

II–III—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	″						
Sept. 22	11 3 19	248.98	11 2 52	472.31	8, 8	g	115	R.	12-inch	
23	11 0 50	264.45	11 1 11	59.89	8, 8	g	160	R.	" "	
25	11 48 24	53.98	11 48 40	70.49	8, 8	g	115	R.	" "	
30	11 5 11	257.62	11 5 6	102.05	8, 8	p	235	R.	" "	
Oct. 7	10 51 48	254.12	10 52 10	149.31	8, 8	f	160	R.	" "	
10	9 57 16	64.60	9 57 7	342.11	8, 8	p	160	R.	" "	Unsteady.
14	11 1 58	252.37	11 2 10	190.58	8, 8	p	160	R.	" "	
15	9 13 7	39.42	9 13 20	18.23	8, 8	p	235	R.	" "	
16	10 54 35	281.98	10 54 18	25.19	8, 8	f–g	235	R.	" "	
17	9 27 18	63.52	9 27 30	290.21	8, 8	e	160	R.	" "	Fine measures.
18	9 13 53	68.55	9 13 43	523.97	8, 10	g	115	R.	" "	
19	11 1 22	216.59	11 1 16	69.34	8, 8	f	235	R.	" "	
21	10 59 52	250.94	10 59 57	234.65	8, 8	p	235	R.	" "	
24	8 44 36	62.02	8 45 12	229.52	8, 8	g	160	R.	" "	
31	8 47 1	60.06	8 47 21	180.37	8, 8	g	160	R.	" "	
Nov. 5	8 44 9	261.05	8 44 5	37.28	8, 8	f	235	R.	" "	
7	8 18 38	56.35	8 18 3	121.28	8, 8	f	235	R.	" "	A trifle unsteady.
9	12 19 0	79.34	12 19 27	149.29	8, 8	f	235	R.	" "	
16	11 12 23	73.37	11 11 33	254.90	8, 8	g	235	R.	" "	
19	9 53 41	253.26	9 54 12	74.22	8, 8	g	235	R.	" "	
21	7 57 1	15.86	7 57 1	26.18	8, 8	p	235	R.	" "	
30	11 9 40	69.86	11 10 16	380.54	8, 8	f	160	R.	" "	
Dec. 12	8 4 59	255.25	8 4 57	101.98	8, 8	p	235	R.	" "	Unsteady.
16	8 9 6	245.39	8 9 18	387.04	8, 8	g	115	R.	" "	
20	7 46 32	61.52	7 46 42	233.60	8, 8	p	235	R.	" "	Strong wind.
30	7 25 2	244.22	7 25 5	316.73	8, 8	f–p	160	R.	" "	Seeing getting poorer.
1905										
Jan. 2	8 7 4	249.63	8 11 12	172.30	8, 8	g	235	R.	12-inch	
4	6 28 29	66.01	6 28 35	478.14	8, 8	g	115	R.	" "	
Oct. 30	10 8 40	70.89	10 9 11	103.06	8, 8	e	335	R.	" "	Fine measures.
31	10 32 16	74.21	10 32 49	89.20	8, 8	g	160	R.	" "	
Nov. 8	11 2 30	74.51	11 2 12	160.93	8, 8	f	160	R.	" "	Unsteady.
10	15 27 18	128.69	15 27 18	43.55	8, 8	f–p	160	R.	" "	
11	9 49 44	256.43	9 50 19	455.43	8, 8	p	115	R.	" "	Unsteady and diffuse.
14	10 35 31	73.06	10 35 34	83.16	8, 8	g	235	R.	" "	Good measures.
21	9 13 42	72.42	9 13 47	84.05	8, 8	f–p	235	R	" "	Unsteady.
Dec. 4	9 13 42	266.25	9 13 57	118.20	8, 8	f–g	235	R.	" "	Good measures.
5	9 24 29	69.95	9 24 1	68.61	9, 8	e	235	R.	" "	
6	13 3 35	64.54	13 2 28	66.01	9, 9	g	160	R.	" "	
11	8 26 0	262.77	8 26 20	178.73	8, 8	f	160	R.	" "	Unsteady.
12	9 6 42	67.82	9 7 29	57.53	8, 8	g	160	R.	" "	Seeing improving.
18	8 26 47	261.03	8 27 6	223.36	8, 8	f	160	R.	" "	Thin clouds.
19	8 1 0	63.43	8 1 0	42.69	8, 8	f	160	R.	" "	Images tremble somewhat.
30	7 47 54	92.77	7 48 38	107.70	8, 8	p	235	R.	" "	Unsteady.
1906										
Jan. 5	7 12 41	76.57	7 12 33	479.41	8, 8	f	115	R.	12-inch	
6	7 24 11	84.86	7 24 4	192.03	8, 8	f	235	R.	" "	
9	8 1 55	279.49	8 2 5	25.42	8, 8	f	115	R.	" "	
10	6 34 19	269.90	6 34 37	35.89	8, 8	f	160	R.	" "	
16	6 35 40	265.46	6 35 47	62.06	8, 8	f–p	160	R.	" "	High wind.
18	5 57 43	49.99	5 57 32	37.28	8, 8	p	160	R.	" "	Unsteady.
25	9 46 19	52.48	9 46 56	42.95	8, 8	f	235	R.	" "	Sky thick.
30	9 0 51	261.36	9 0 44	96.76	8, 8	g	235	R.	" "	Hazy.
Feb. 9	9 38 39	74.37	9 38 50	327.96	8, 8	f	160	R.	" "	Considerable wind; seeing becoming poorer.

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SATELLITES OF JUPITER—Continued.

II–IV.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
Dec. 8	5 15 47	102. 16	5 17 5	5. 13	6, 6	g	235	K.	12-inch	Sat. II much the brighter.
1903										
May 4	16 42 46	245. 10	16 43 28	311. 16	6, 4	g	115	K.	12-inch	
8	16 25 7	63. 52	16 25 13	125. 99	6, 4	e	115	K.	" "	
22	16 11 55	245. 35	16 13 23	272. 48	6, 4	..	235	K.	" "	
July 7	15 58 7	238. 07	15 58 22	143. 09	6, 4	..	115	K.	" "	
19	16 11 9	66. 09	16 12 1	344. 38	6, 4	..	115	K.	" "	
Aug. 17	13 59 41	36. 30	14 0 8	50. 00	6, 4	..	335	K.	" "	
24	12 44 49	236. 19	12 44 43	100. 37	6, 4	f	335	K.	" "	Unsteady; thick at times.
Sept. 25	12 36 25	68. 29	12 36 58	179. 12	6, 4	g	235	K.	" "	
Oct. 6	9 12 2	50. 29	9 12 21	88. 56	6, 4	f	235	K.	" "	Hazy.
12	10 29 45	72. 45	10 29 50	176. 28	6, 4	p	235	K.	" "	
13	11 47 8	237. 85	11 47 19	68. 60	6, 4	p	235	K.	" "	Unsteady and diffuse.
14	9 40 23	80. 59	9 41 10	38. 47	6, 4	e	235	K.	" "	
21	8 41 3	299. 55	8 41 30	26. 91	6, 4	g	235	K.	" "	
Nov. 22	7 24 12	248. 43	7 23 42	276. 07	6, 6	g	160	Hd.	" "	
25	6 53 52	56. 13	6 53 48	113. 97	6, 6	g	160	Hd.	" "	
28	6 57 16	64. 79	6 57 37	357. 84	6, 6	g	160	Hd.	" "	Through clouds.
Dec. 1	7 6 35	71. 19	7 7 5	148. 96	6, 6	g	160	Hd.	" "	
3	6 38 47	70. 88	6 39 17	95. 00	6, 6	..	160	Hd.	" "	Unsteady.
6	7 24 33	245. 73	7 24 48	459. 80	6, 6	g	160	Hd.	" "	
7	6 53 9	244. 96	6 53 22	360. 92	6, 6	..	160	Hd.	" "	A trifle unsteady.
11	6 44 52	61. 07	6 44 57	79. 80	6, 6	g	160	Hd.	" "	
20	6 47 2	247. 59	6 47 16	142. 29	6, 6	p	160	Hd.	" "	Unsteady and woolly.
28	5 4 0	61. 62	5 4 19	219. 93	6, 6	..	160	Hd.	" "	Daylight illumination.

III–IV.

1902										
June 8	15 42 53	70. 36	15 47 30	393. 38	8, 8	g	115	K.	12-inch	
10	15 23 14	71. 11	15 25 42	235. 13	8, 8	f	...	K.	" "	Date doubtful; omitted and supplied afterwards.
Aug. 11	11 29 30	71. 91	11 30 46	51. 21	8, 8	f	335	K.	" "	
1903										
May 8	16 38 51	60. 05	16 38 52	180. 31	6, 4	e	115	K.	12-inch	
28	16 9 58	63. 47	16 9 51	261. 37	6, 4	..	235	K.	" "	
June 2	16 19 27	234. 10	16 20 29	110. 70	6, 4	g	335	K.	" "	
July 7	16 9 16	238. 01	16 9 18	194. 84	6, 4	..	115	K.	" "	
Sept. 25	12 48 34	75. 51	12 48 55	139. 70	6, 4	g	235	K.	" "	
Oct. 12	10 17 31	65. 89	10 17 43	267. 17	6, 4	p	235	K.	" "	Unsteady and diffuse.
Nov. 9	6 48 4	55. 15	6 48 31	97. 42	6, 4	g	235	K	" "	
24	6 39 7	259. 08	6 39 27	88. 47	6, 6	..	115	Hd.	" "	Unsteady.
29	6 49 30	67. 15	6 50 2	262. 32	6, 6	g	160	Hd.	" "	
30	7 9 19	67. 17	7 9 39	160. 30	6, 6	g	160	Hd.	" "	
Dec. 1	7 18 22	65. 85	7 18 38	207. 10	6, 6	g	160	Hd.	" "	
13	5 7 18	64. 88	5 7 45	170. 22	6, 6	..	235	Hd.	" "	Very unsteady and woolly.
14	6 46 54	63. 91	6 47 25	185. 94	6, 6	g	160	Hd.	" "	
15	7 13 23	64. 15	7 13 43	357. 86	6, 6	f	160	Hd.	" "	
28	4 54 34	246. 97	4 54 57	226. 17	6, 6	..	160	Hd.	" "	Daylight illumination.
1904										
Jan. 3	7 29 58	68. 57	7 30 22	257. 07	6, 6	f	235	Hd.	12-inch	
4	7 6 31	230. 93	7 6 43	60. 68	6, 6	g	235	Hd.	" "	
Sept. 2	10 59 30	247. 62	11 0 56	371. 25	8, 8	f	115	R.	" "	
10	11 2 15	71. 68	11 2 27	489. 13	8, 8	f	115	R.	" "	
11	10 17 55	79. 79	10 17 51	147. 92	8, 8	g	235	R.	" "	

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SATELLITES OF JUPITER—Continued.

III–IV—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	″						
Sept. 15	11 12 34	219.46	11 12 53	51.22	8, 8	p	235	R.	12-inch	
16	11 42 34	242.32	11 42 44	326.89	8, 8	f	160	R.	" "	
21	14 5 41	49.07	14 5 50	155.53	8, 8	p	235	R.	" "	
22	10 43 49	63.67	10 44 25	497.47	8, 8	g	115	R.	" "	
25	11 31 56	68.61	11 32 6	340.45	8, 8	g	115	R.	" "	
26	10 46 22	67.59	10 45 56	284.90	8, 8	f–p	115	R.	" "	Clouds.
30	11 32 34	78.21	11 33 13	249.44	8, 8	p	160	R.	" "	Clouds too thick and seeing too poor to continue.
Oct. 1	10 12 28	235.21	10 12 37	241.40	8, 8	g	160	R.	" "	
6	13 27 17	269.13	13 27 39	84.91	8, 8	f–p	235	R.	" "	Seeing becomes miserable.
7	10 14 29	53.31	10 14 26	85.61	8, 8	g	160	R.	" "	
10	11 6 13	49.41	11 6 21	77.79	8, 8	p	235	R.	" "	
15	10 11 22	73.12	10 9 56	474.88	8, 8	p–f	115	R.	" "	Seeing improves.
16	10 41 32	218.02	10 41 58	106.01	8, 8	f–g	235	R.	" "	
21	11 21 38	247.24	11 22 10	277.15	8, 8	p	160	R.	" "	
22	9 55 6	246.67	9 55 10	374.07	8, 8	p	160	R.	" "	
24	9 50 10	249.79	9 50 2	514.13	8, 8	f–g	115	R.	" "	
31	9 25 5	81.50	9 25 14	124.91	8, 8	f–g	235	R.	" "	Seeing becomes poorer.
Nov. 1	8 17 37	232.39	8 18 1	83.77	8, 8	p	235	R.	" "	
5	7 47 3	241.47	7 47 12	310.34	8, 8	..	160	R.	" "	Unsteady.
9	12 42 10	254.16	12 42 8	359.90	8, 10	f	160	R.	" "	
14	13 29 47	67.74	.. .. ..	.....	8, .	p	160	R.	" "	
15	9 53 25	66.97	9 54 6	272.09	8, 8	g	160	R.	" "	Fine images through thin clouds.
16	11 35 59	66.34	11 36 14	376.16	8, 8	g	160	R.	" "	
19	9 35 29	77.02	9 36 8	216.78	8, 8	g	235	R.	" "	
28	9 37 49	53.00	9 37 48	44.25	8, 8	p	235	R.	" "	Thin clouds.
30	10 54 38	62.20	10 54 58	346.80	8, 8	f	115	R.	" "	
Dec. 12	8 24 56	246.92	8 25 4	440.83	8, 8	p	115	R.	" "	Unsteady.
13	9 26 18	248.83	9 26 14	437.90	8, 8	g	115	R.	" "	
14	6 9 29	254.24	6 9 57	236.50	8, 8	g	235	R.	" "	
19	9 50 43	69.89	9 52 39	439.02	8, 8	p	115	R.	" "	Unsteady and high wind.
20	7 30 26	78.90	7 30 22	123.90	8, 8	p	235	R.	" "	Strong wind.
30	8 2 52	33.62	8 1 56	70.00	8, 8	p	235	R.	" "	Very unsteady and woolly.
1905										
Jan. 2	7 49 40	66.69	7 49 58	497.73	8, 8	g	115	R.	12-inch	
4	6 48 29	67.18	6 48 47	233.87	8, 8	g	160	R.	" "	
Oct. 13	11 19 28	72.52	11 20 25	375.08	8, 8	p	160	R.	" "	Unsteady; seeing too poor to continue.
30	10 29 31	77.92	10 29 33	414.19	8, 8	e	160	R.	" "	Images steady.
31	10 55 35	78.20	10 55 49	292.75	8, 8	g	160	R.	" "	
Nov. 2	11 2 32	76.89	11 2 43	373.76	8, 8	f	160	R.	" "	
11	10 33 36	262.65	10 33 14	336.66	8, 8	f	115	R.	" "	Unsteady.
14	9 52 1	262.86	9 51 47	175.50	8, 8	e	235	R.	" "	Good measures; steady.
21	10 2 32	86.79	10 2 40	311.37	8, 8	p	160	R.	" "	Unsteady.
25	10 54 26	257.14	10 57 9	306.65	8, 8	g–f	115	R.	" "	Measures interrupted by failure of hand lamp.
Dec. 6	13 28 43	81.73	13 29 4	294.29	8, 8	g	160	R.	" "	
11	9 2 20	230.09	9 1 58	79.05	8, 8	f	160	R.	" "	Clouds.
12	8 13 31	252.38	8 13 43	456.02	8, 8	f	115	R.	" "	
18	8 5 58	73.72	8 6 0	445.49	8, 8	f	115	R.	" "	Thin clouds; moisture on ocular.
19	9 1 55	75.74	9 1 46	450.37	8, 8	f	115	R.	" "	Clouds; interrupted by failure of hand lamp.
1906										
Jan. 5	7 48 5	50.79	7 47 48	74.40	8, 8	f	235	R.	12-inch	
10	6 16 10	83.32	6 16 15	325.85	8, 8	f	160	R.	" "	
16	6 16 59	254.29	6 17 6	305.84	8, 8	f–p	115	R.	" "	High wind.
25	9 22 28	79.86	9 22 35	303.30	8, 9	f	115	R.	" "	Misty.
29	9 26 21	85.01	9 27 27	120.70	8, 8	f–g	235	R.	" "	
30	9 19 42	233.18	9 20 6	73.68	8, 8	g	235	R.	" "	Hazy.
Feb. 9	8 43 34	74.94	8 43 28	220.54	8, 8	g–f	160	R.	" "	

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SIXTH SATELLITE OF JUPITER.

DATE.	WASHINGTON MEAN TIME.	SATELLITE—STAR.		SATELLITE'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 21	13 17 6	+0 17.69	+3 5.7	4 11 0.45	+19 55 7.9	9.053$_n$	0.462	2	7, 6	R.	26-inch
29	12 39 0	+0 13.09	+5 19.1	4 8 18.23	+19 42 19.2	9.083$_n$	0.468	3	9, 11	R.	" "
30	12 22 7	−0 9.24	+3 38.8	4 7 55.92	+19 40 38.9	9.167$_n$	0.474	4	9, 9	R.	" "
31	12 6 21	+0 15.09	−0 20.9	4 7 33.46	+19 38 58.8	9.230$_n$	0.480	5	9, 8	R.	" "
Nov. 1	11 58 32	−0 8.16	−2 3.5	4 7 10.23	+19 37 16.3	9.247$_n$	0.482	6	9, 7	R.	" "
22	15 20 18	−0 1.26	−5 14.2	3 57 54.21	+19 0 36.2	9.582	0.583	7	10, 7	R.	" "
Dec. 4	13 59 15	+0 5.66	+2 7.7	3 52 30.13	+18 41 50.2	9.534	0.563	8	9, 10	R.	" "
26	8 31 49	−0 8.97	+5 19.1	3 44 36.06	+18 19 2.5	9.045$_n$	0.495	9	10, 6	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	4 11 18.03	....	+19 42 42.1	....	Three obs'ns (Dec., 1905) on Wash. 9-inch transit circle.	This star is B. D. +19° 687 (8^m.5)= Berlin A, A. G. 1119.
2	4 10 39.46	+3.30	+19 52 0.1	+2.1	Microm. comp. with 1, [−0^m 38^s.57, +9′ 18″.0].	
3	4 8 1.68	+3.46	+19 36 57.5	+2.6	Microm. comp. with 1, [−3^m 16^s.34, −5′ 44″.5].	
4	4 8 1.68	+3.48	+19 36 57.5	+2.6	Microm. comp. with 1, [−3^m 16^s.34, −5′ 44″.5].	
5	4 7 14.86	+3.51	+19 39 17.0	+2.7	Microm. comp. with 1, [−4^m 3^s.16, −3′ 25″.0].	This star is n. fol. component of B. D. +19° 674 (9^m.1).
6	4 7 14.86	+3.53	+19 39 17.0	+2.8	Microm. comp. with 1, [−4^m 3^s.16, −3′ 25″.0].	This star is n. fol. component of B. D. +19° 674 (9^m.1).
7	3 57 51.64	+3.83	+19 5 46.2	+4.2	Three obs'ns (Dec., 1905) on Wash. 9-inch transit circle.	This star is B. D. +18° 575 (9^m.5).
8	3 52 20.55	+3.92	+18 39 37.6	+4.9	Microm. comp. with 10 [+0^m 47^s.49, +5′ 44″.4].	This star is n. fol. component of B. D. +18° 565 (9^m.5).
9	3 44 41.11	+3.92	+18 13 38.0	+5.4	Microm. comp. with 11 [−2^m 14^s.56, −5′ 11″.9].	
10	3 51 33.06	....	+18 33 53.2	....	Berlin A, A. G. 1052	
11	3 46 55.67	....	+18 18 49.9	....	Berlin A, A. G. 1027	

The quantities $\Delta\alpha$ were all measured with the micrometer. The values of $\Delta\alpha$ and $\Delta\delta$ in the column "Authority" are reduced to 1905 0.

Oct. 21, satellite very faint. Oct. 30, seeing steady, but misty. Oct. 31, seeing good; satellite very faint. Nov. 1, seeing steady but diffuse; power 400. Dec. 4, sky not very clear; satellite visible only at intervals. Dec. 26, seeing good.

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SATELLITES OF SATURN.

MIMAS–ENCELADUS.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	"						
July 3	15 35 30	274.93	15 35 24	8.85	8, 8	p	400	Fk.	26-inch	Enceladus very difficult.
Aug. 21	12 39 51	103.00	12 39 26	37.53	8, 8	g	400	Hd.	" "	Bright field illumination at this opposition.
23	12 0 34	24.61	11 59 24	7.62	8, 8	f	400	Hd.	" "	
24	11 52 19	157.25	11 52 4	11.65	9, 8	f	400	Hd.	" "	
Sept. 11	9 47 52	224.09	9 48 41	9.56	8, 9	g	400	Hd.	" "	Bright wires.
1905										
July 9	13 17 46	254.93	13 18 30	7.44	8, 8	e	400	Hd.	26-inch	
Aug. 1	12 25 44	91.93	12 25 52	59.73	8, 8	g	400	Hd.	" "	
3	12 5 41	172.43	12 6 9	6.31	8, 8	e	400	Hd.	" "	
19	11 47 54	98.40	11 47 38	65.67	8, 8	p	400	Hd.	" "	Mimas very faint.
21	10 44 56	256.51	10 45 8	12.46	8, 8	e	400	Hd.	" "	
27	11 18 43	335.50	11 19 5	5.90	8, 8	g	400	Hd.	" "	Bright wire illumination at this opposition.
Sept. 21	11 37 45	103.45	11 41 40	54.36	4, 8	f	400	Hd.	" "	
Oct. 8	8 42 45	269.26	8 42 50	7.57	8, 8	e	400	Hd.	" "	
1906										
Aug. 15	12 2 2	264.89	12 2 15	9.83	4, 4	e	400	Hd.	26-inch	Bright field illumination at this opposition.
22	12 28 7	277.84	12 26 32	59.02	4, 4	f	400	Hd.	" "	
Sept. 1	11 16 24	94.83	11 16 23	53.31	4, 5	f	400	Hd.	" "	
19	8 55 5	95.81	8 55 16	62.33	4, 4	g	400	Hd.	" "	
Oct. 14	7 48 2	255.97	7 47 47	5.23	4, 5	e	400	Hd.	" "	Bright wires.

MIMAS–TETHYS.

1901										
Apr. 29	16 9 42	68.36	16 10 0	29.37	10, 10	4	400	See	26-inch	
June 10	13 11 30	90.20	13 11 48	16.85	10, 10	4	400	See	" "	Extremely difficult.
18	13 53 0	113.45	13 53 12	42.45	10, 10	4	600	See	" "	
27	12 58 36	85.42	12 58 30	15.41	10, 10	5	400	See	" "	
27	13 23 6	73.26	13 23 12	14.59	10, 10	5	400	See	" "	Mimas difficult.
28	12 15 36	272.93	12 17 12	70.40	10, 10	5	400	See	" "	
July 9	10 24 0	135.47	10 24 30	34.20	10, 10	2–3	400	See	" "	Mimas very difficult.
15	10 30 0	269.67	10 30 48	69.61	10, 10	4	400	See	" "	Good measures.
15	11 12 30	271.70	11 12 48	70.88	10, 10	4	400	See	" "	
21	11 32 54	283.51	11 33 12	53.54	10, 10	4	400	See	" "	Fairly good measures
23	10 49 12	27.48	10 49 12	20.36	10, 10	3–4	400	See	" "	Mimas very difficult.
31	10 34 18	46.35	10 34 0	10.99	10, 10	2–3	400	See	" "	Mimas very difficult.
Aug. 1	10 37 36	269.64	10 37 12	68.84	10, 10	4	400	See	" "	
2	9 13 24	59.15	9 13 36	16.81	10, 10	3–4	400	See	" "	Mimas quite plain.
7	11 12 48	349.42	11 13 0	20.36	10, 10	4	600	See	" "	Mimas very difficult.
9	10 18 0	27.00	10 18 18	20.74	10, 10	4	400	See	" "	Excellent measures.
9	10 32 6	33.48	10 32 6	18.47	10, 10	4	400	See	" "	
17	8 32 24	202.57	8 32 36	14.84	10, 10	4	400	See	" "	Very good measures.
18	9 29 0	268.15	9 28 54	67.60	10, 10	4	400	See	" "	
19	8 25 54	48.93	8 25 48	13.36	11, 10	4	400	See	" "	Excellent measures.
26	8 55 0	287.40	8 58 36	56.71	5, 5	3	400	See	" "	Mimas difficult; hazy.
Sept. 3	9 6 18	47.11	9 6 6	9.35	10, 10	4–5	400	See	" "	Good measures.
4	8 35 6	268.36	8 37 0	65.76	10, 10	3–4	400	See	" "	Excellent measures
1902										
May 1	15 12 36	133.68	15 12 45	13.30	10, 10	2	400	See	26-inch	Mimas very difficult.
9	14 37 30	169.98	14 37 15	13.84	10, 10	3	400	See	" "	Mimas well seen but faint.
June 1	14 36 15	273.05	14 36 30	66.50	10, 10	5	400	See	" "	Mimas quite plain.
10	14 7 56	131.66	14 8 15	22.10	10, 10	3–4	400	See	" "	
11	13 6 38	74.04	13 7 0	42.04	10, 10	3	400	See	" "	
21	11 29 0	110.52	11 28 30	14.55	10, 10	2–3	400	See	" "	Mimas plain at times.

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SATELLITES OF SATURN—Continued.

MIMAS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
July 13	12 56 30	42.87	12 56 30	31.90	10, 10	4–5	400	See	26-inch	Excellent measures.
13	13 17 0	51.28	13 17 0	34.42	10, 10	3–4	400	See	" "	
14	12 20 52	121.61	12 21 0	29.40	10, 10	3	400	See	" "	Mimas difficult.
14	12 36 38	125.40	12 37 0	27.31	10, 10	3	400	See	" "	
16	10 45 0	135.93	10 45 0	24.81	10, 10	3–4	400	See	" "	Excellent measures.
16	11 8 38	140.12	11 9 0	24.86	10, 10	3–4	400	See	" "	Mimas well seen.
16	11 31 0	147.33	11 31 0	23.36	10, 10	4	400	See	" "	Mimas well seen.
16	11 45 30	151.67	11 46 0	23.69	10, 10	4	400	See	" "	
16	12 5 30	158.73	12 5 30	22.90	10, 10	4	400	See	" "	Mimas well seen.
16	12 22 0	164.81	12 22 0	21.63	10, 10	3–4	400	See	" "	Good measures; Mimas difficult.
22	12 2 52	271.93	12 3 0	70.99	10, 10	2	400	See	" "	Mimas very difficult.
31	10 55 0	118.74	10 55 0	32.02	10, 10	4	400	See	" "	Mimas very plain.
31	11 16 30	120.50	11 16 30	32.52	10, 10	3–4	400	See	" "	
31	11 28 0	122.24	11 28 0	31.75	10, 10	3–4	400	See	" "	Clouds interrupt.
Aug. 2	8 49 15	123.78	8 49 30	30.85	10, 10	2–3	400	See	" "	Mimas difficult.
2	11 7 0	146.81	11 7 0	23.41	10, 10	3	400	See	" "	
3	9 16 0	77.33	9 16 0	40.04	10, 10	2–3	400	See	" "	Mimas very difficult.
18	8 53 30	45.46	8 53 45	30.43	10, 10	3	400	See	" "	Mimas difficult.
18	10 53 30	66.88	10 53 30	37.60	10, 10	2–3	400	See	" "	Unsteady.
19	9 42 30	139.09	9 42 30	28.14	10, 10	2	400	See	" "	Mimas very difficult.
25	10 40 52	269.54	10 41 0	69.67	10, 10	3–4	400	See	" "	Mimas quite plain.
25	11 3 22	271.88	11 3 0	71.36	10, 10	3	400	See	" "	
25	11 20 0	273.04	11 20 0	71.58	10, 10	3	400	See	" "	Good measures.
27	9 33 0	277.29	9 33 30	71.36	10, 10	3	400	See	" "	Mimas difficult.
27	9 48 0	279.29	9 48 0	70.73	10, 10	3	400	See	" "	
28	8 4 22	93.89	8 4 15	15.92	10, 10	3	400	See	" "	
28	9 35 0	88.19	9 35 0	17.91	10, 10	3	400	See	" "	Good measures; Mimas difficult.
29	7 5 0	279.35	7 5 0	69.82	10, 10	4	400	See	" "	Mimas difficult.
Sept. 5	9 0 30	139.29	9 0 30	30.58	10, 10	4	400	See	" "	Mimas well seen.
5	9 45 52	148.60	9 45 0	28.57	10, 10	4	400	See	" "	Mimas well seen.
6	7 31 22	68.26	7 31 0	34.49	10, 10	3	400	See	" "	
1903										
July 28	11 31 30	96.81	11 31 0	72.24	8, 8	g	400	Fk.	26-inch	Mimas difficult
28	11 51 55	97.62	11 51 0	72.17	8, 8	g	175	Fk.	" "	Mimas difficult.
Sept. 14	9 29 28	235.25	9 31 34	7.05	9, 8	g	175	Fk.	" "	Mimas very difficult.
1904										
July 3	14 51 31	352.18	14 51 31	8.87	8, 8	f	400	Fk.	26-inch	Mimas very difficult.
3	15 14 7	3.89	15 13 0	8.39	8, 8	f	400	Fk.	" "	
20	14 3 45	340.93	14 3 45	9.09	8, 8	p	400	Hd.	" "	
Aug. 15	12 0 36	269.15	12 2 22	58.01	8, 8	e	400	Hd.	" "	
21	12 58 38	301.53	12 57 13	20.72	8, 8	g	400	Hd.	" "	
23	12 13 45	316.58	12 13 46	10.38	8, 8	f	400	Hd.	" "	
24	11 35 14	105.60	11 36 11	62.71	8, 8	f	400	Hd.	" "	
Sept. 11	10 1 10	307.09	10 2 3	8.10	8, 9	g	400	Hd.	" "	Bright wires.
17	11 15 43	331.85	11 15 24	13.08	8, 9	g	400	Hd.	" "	Bright wires.
Oct. 7	7 32 39	269.56	7 32 2	49.57	8, 7	g	400	Hd.	" "	Bright wires; poor observation.
1905										
July 9	13 32 29	96.48	13 33 3	11.38	8, 8	e	400	Hd.	26-inch	
Aug. 3	12 17 2	142.28	12 17 28	12.44	8, 8	e	400	Hd.	" "	
21	10 55 16	91.41	10 55 29	45.18	8, 8	e	400	Hd.	" "	
27	11 28 32	93.20	11 28 35	16.98	8, 8	g	400	Hd.	" "	
1906										
Aug. 15	12 8 59	95.75	12 9 8	73.59	4, 4	e	400	Hd.	26-inch	
Sept. 1	11 7 11	95.78	11 7 17	73.65	4, 4	f	400	Hd.	" "	
19	9 5 7	265.07	9 5 24	19.02	4, 4	g	400	Hd.	" "	
Oct. 12	9 19 21	281.02	9 19 16	53.96	5, 4	e	400	Hd.	" "	Bright wires.
14	7 58 22	284.42	7 58 14	44.95	4, 4	e	400	Hd.	" "	Bright wires.

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SATELLITES OF SATURN—Continued.

MIMAS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	h m s	"						
Aug. 7	14 36 13	94.54	14 35 54	62.13	4, 4	g	400	Hd.	26-inch	Mimas faint.
18	13 9 21	95.45	13 9 41	13.36	4, 4	f	400	Hd.	" "	Bright wires.
Sept. 12	11 22 54	95.46	11 22 59	64.22	4, 4	f	400	Hd.	" "	Bright wires.
13	10 19 21	271.19	10 19 15	3.81	8, 8	e	400	Hd.	" "	
13	11 52 44	275.42	11 53 40	1.28	1, 2	e	400	Hd.	" "	
20	10 55 18	275.51	10 55 26	57.34	4, 5	g	400	Hd.	" "	
29	10 46 15	95.90	11 46 31	57.56	4, 4	f	400	Hd.	" "	Mimas faint.
Oct. 6	10 53 44	281.92	10 53 40	7.15	4, 4	f	400	Hd.	" "	
9	10 4 49	274.74	10 4 57	58.20	4, 6	f	400	Hd.	" "	
16	9 19 12	95.96	9 19 18	69.15	4, 4	g	400	Hd.	" "	

MIMAS–DIONE.

1901										
Aug. 1	10 12 36	55.77	10 12 24	22.65	10, 10	4	400	See	26-inch	Mimas quite plain.
1904										
Aug. 23	12 27 22	167.61	12 27 33	15.79	8, 8	f	400	Hd.	26-inch	
Sept. 11	10 12 40	127.29	10 12 34	39.02	8, 8	g	400	Hd.	" "	Bright wires.
17	11 2 38	272.22	11 3 27	80.46	8, 8	g	400	Hd.	" "	Bright wires.
1905										
Aug. 3	12 27 33	202.32	12 27 44	10.97	8, 8	e	400	Hd.	26-inch	
18	12 49 18	87.24	12 49 1	56.77	8, 8	f	400	Hd.	" "	
21	11 14 20	94.42	11 17 50	69.74	4, 8	e	400	Hd.	" "	
27	11 39 47	111.05	11 38 11	20.43	8, 8	g	400	Hd.	" "	Mimas very faint.
Sept. 21	11 28 28	116.94	11 28 18	37.84	8, 8	f	175	Hd.	" "	

MIMAS–RHEA.

1904										
Aug. 15	11 45 5	87.44	11 45 23	48.91	8, 8	e	400	Hd.	26-inch	Mimas very faint.
23	12 43 54	44.54	12 43 12	25.06	9, 8	f	400	Hd.	" "	
Sept. 11	10 26 27	92.24	10 26 45	94.11	8, 8	e	400	Hd.	" "	Bright wires.
17	10 48 32	234.39	10 49 20	32.98	8, 8	g	400	Hd.	" "	Bright wires.
1905										
Aug. 1	13 39 15	292.85	13 39 7	31.17	8, 8	g	400	Hd.	26-inch	
18	11 48 18	258.57	11 48 31	30.64	8, 8	f	400	Hd.	" "	
19	11 34 18	286.22	11 34 38	40.84	8, 8	p	400	Hd.	" "	
Sept. 21	11 16 48	91.10	11 17 1	95.33	8, 8	f	175	Hd.	" "	
1907										
Aug. 7	14 27 51	272.94	14 27 49	54.94	4, 5	g	400	Hd	26-inch	
11	12 10 31	277.14	12 10 42	25.61	4, 4	g	400	Hd.	" "	
18	13 15 24	94.65	13 15 28	45.51	4, 4	f	400	Hd.	" "	Bright wires.
Sept. 12	11 16 10	274.00	11 16 27	47.49	4, 4	f	400	Hd.	" "	Bright wires.
13	10 25 35	270.12	10 25 36	22.08	4, 4	e	400	Hd	" "	
20	11 1 44	286.78	11 1 42	5.21	4, 4	g	400	Hd.	" "	
20	11 31 49	283.14	11 32 1	7.34	4, 4	g	400	Hd.	" "	
Oct. 9	10 19 20	274.15	10 19 32	88.87	4, 4	f	400	Hd.	" "	
16	9 24 55	94.59	9 24 57	109.00	4, 4	g	400	Hd.	" "	

ENCELADUS–TETHYS.

1901										
Apr. 26	15 27 54	215.51	15 28 12	6.43	10, 10	2	400	See	26-inch	Enceladus very difficult.
27	15 46 36	283.28	15 46 30	32.14	10, 10	2	400	See	" "	Enceladus difficult.
28	16 2 18	128.18	16 2 48	43.94	10, 10	4	400	See	" "	
29	15 49 54	24.31	15 50 0	30.30	10, 10	4	400	See	" "	Enceladus difficult.
May 4	15 29 54	262.82	15 31 30	66.70	10, 10	4	400	See	" "	

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SATELLITES OF SATURN—Continued.

ENCELADUS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	″						
May 13	14 38 24	106.98	14 38 30	63.22	10, 10	4	400	See	26-inch	
14	14 48 36	321.84	14 49 12	40.02	10, 10	4	400	See	" "	
15	14 27 18	225.37	14 28 6	27.91	10, 10	4	400	See	" "	
22	14 35 42	14.79	14 36 48	13.95	10, 10	2	400	See	" "	Enceladus difficult.
23	14 7 12	248.22	14 7 12	47.29	10, 10	4	400	See	" "	
28	13 34 12	95.16	13 34 48	68.50	10, 10	3	400	See	" "	
June 4	12 41 12	67.14	12 41 48	42.24	10, 10	3–4	400	See	" "	
9	13 18 42	98.93	13 19 30	59.71	10, 10	3	400	See	" "	Very difficult.
10	12 53 24	109.24	12 53 30	18.74	10, 10	4	400	See	" "	
18	12 33 0	131.18	12 33 12	50.35	10, 10	3–4	400	See	" "	
19	12 15 54	39.80	12 16 36	28.94	10, 11	3	400	See	" "	
24	11 50 54	265.81	11 51 0	58.28	10, 10	3–4	400	See	" "	
27	12 35 48	70.68	12 36 12	50.89	10, 10	4	400	See	" "	
28	11 14 6	268.02	11 14 6	77.48	10, 10	2–3	400	See	" "	
30	10 46 36	302.31	10 47 12	17.21	10, 10	2–3	400	See	" "	
July 3	10 45 48	109.67	10 45 42	72.97	10, 10	2	400	See	" "	
5	11 19 30	225.39	11 19 36	10.91	10, 10	2–3	400	See	" "	
9	10 42 30	246.69	10 43 0	43.98	10, 10	2–3	400	See	" "	
10	10 22 0	83.77	10 22 0	22.73	10, 10	2–3	400	See	" "	Enceladus very difficult.
15	9 57 0	287.19	9 57 36	23.34	10, 10	4	400	See	" "	
15	11 20 54	294.14	11 21 0	19.02	10, 10	4	400	See	" "	
20	10 16 48	167.15	10 17 0	10.38	10, 10	3	400	See	" "	
21	9 40 48	267.71	9 41 30	25.13	10, 10	4	400	See	" "	
23	9 48 24	308.82	9 48 36	52.17	10, 10	3–4	400	See	" "	Enceladus fairly well seen.
29	9 33 12	82.99	9 33 18	59.29	10, 10	2	400	See	" "	
31	8 25 24	341.15	8 25 30	11.41	10, 10	2–3	400	See	" "	
Aug. 1	10 30 6	248.88	10 30 0	47.98	10, 10	4	400	See	" "	
2	9 26 0	88.16	9 26 12	77.73	10, 10	3–4	400	See	" "	
7	9 12 6	291.88	9 12 18	68.90	10, 10	4	400	See	" "	
8	10 2 6	169.46	10 2 12	27.90	10, 10	3	400	See	" "	
9	9 7 48	47.36	9 8 12	13.12	10, 10	3	400	See	" "	
17	8 38 18	74.22	8 41 30	62.21	5, 5	3	400	See	" "	Clouds interrupt.
18	10 1 6	281.17	10 4 42	61.61	10, 10	3–1	400	See	" "	Clouds interrupt.
19	8 35 42	109.70	8 35 48	23.59	10, 10	4	400	See	" "	
20	8 28 42	230.25	8 28 48	13.51	10, 10	4	400	See	" "	
21	8 39 48	80.97	8 43 18	55.94	5, 10	3–4	400	See	" "	Clouds interrupt.
22	7 55 21	277.37	7 55 0	78.12	10, 10	3	400	See	" "	
26	7 37 30	280.58	7 37 42	60.24	10, 10	3–4	400	See	" "	
27	7 17 24	123.01	7 17 12	56.46	10, 10	3	400	See	" "	Enceladus difficult.
28	7 48 54	24.14	7 48 54	28.80	10, 10	2	400	See	" "	Very unsteady.
29	8 12 18	253.74	8 12 12	20.40	10, 10	5	400	See	" "	
30	7 34 18	292.76	7 34 30	19.09	10, 10	3–4	400	See	" "	
Sept. 3	7 56 30	98.12	7 57 0	26.63	10, 10	3	400	See	" "	
4	7 56 24	185.31	7 56 42	10.29	10, 10	3	400	See	" "	
6	8 4 36	269.70	8 4 36	74.59	10, 10	4–5	400	See	" "	
7	7 38 6	106.48	7 38 0	59.38	10, 10	3	400	See	" "	Enceladus difficult.
9	6 58 30	71.64	6 58 42	17.21	10, 10	3–4	400	See	" "	
12	8 19 48	350.85	8 20 30	26.64	10, 10	2	400	See	" "	
1902										
Apr. 30	16 15 54	338.91	16 16 15	19.89	10, 10	2–3	400	See	26-inch	Enceladus difficult.
May 1	15 17 30	152.09	15 20 0	4.96	5, 10	2–3	400	See	" "	Enceladus extremely difficult.
1	15 24 0	155.23	.. .. ..	.....	5, ..	2–3	400	See	" "	Enceladus extremely difficult.
5	15 13 22	247.26	15 14 15	26.11	10, 10	2	400	See	" "	Enceladus very difficult.
9	14 47 15	254.74	14 47 21	54.33	10, 10	3	400	See	" "	
21	14 15 53	29.72	14 16 45	4.37	10, 10	3–4	400	See	" "	

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SATELLITES OF SATURN—Continued.

ENCELADUS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
May 25	14 49 30	87.06	14 50 0	47.99	10, 10	1–2	400	See	26-inch	
29	14 16 5	90.74	14 16 15	74.12	10, 10	2	400	See	" "	
30	14 28 15	285.72	14 27 48	48.40	10, 10	3	400	See	" "	Enceladus difficult.
June 1	13 46 0	252.98	13 46 0	28.73	10, 10	5	400	See	" "	
4	13 42 38	148.50	13 43 30	24.35	10, 10	1–2	400	See	" "	
5	14 2 52	344.27	14 3 0	4.30	10, 10	2–3	400	See	" "	
8	14 23 30	102.28	14 23 15	26.94	10, 10	2–3	400	See	" "	Unsteady.
10	13 15 22	257.39	13 16 15	9.56	10, 10	3	400	See	" "	Enceladus difficult.
11	13 19 30	304.74	13 20 0	24.49	10, 10	2–3	400	See	" "	Clouds interrupt.
23	12 5 30	122.90	12 5 30	54.44	10, 10	3	400	See	" "	
24	12 3 15	14.11	12 3 0	21.64	10, 10	2–3	400	See	" "	
July 11	10 25 30	275.05	10 26 45	36.59	10, 10	2–3	400	See	" "	
12	10 48 0	112.28	10 48 30	62.78	10, 10	2–3	400	See	" "	
13	11 2 40	338.79	11 2 45	36.15	10, 10	3	400	See	" "	Enceladus difficult.
13	13 6 30	23.50	13 6 0	32.71	10, 10	4–5	400	See	" "	
14	10 41 0	239.14	10 41 0	33.87	10, 10	3	400	See	" "	
16	10 38 8	121.60	10 38 30	26.92	10, 10	3	400	See	" "	
16	11 52 22	131.06	11 52 0	24.40	10, 10	4	400	See	" "	
22	11 49 30	264.60	11 49 30	65.88	10, 10	2–3	400	See	" "	Unsteady and blurred.
31	8 58 15	104.70	8 58 15	32.60	10, 10	3–4	400	See	" "	Enceladus difficult.
Aug. 2	8 59 0	196.86	8 59 0	31.85	10, 10	2–3	400	See	" "	Enceladus difficult.
3	9 0 30	77.20	9 0 30	46.72	10, 10	2–3	400	See	" "	Enceladus difficult.
7	9 39 0	86.60	9 39 0	73.72	10, 10	1–2	400	See	" "	
16	8 12 8	109.42	8 12 0	63.62	10, 10	2	400	See	" "	Blurred and unsteady; Enceladus difficult.
17	9 10 0	160.19	9 10 0	35.73	10, 10	3	400	See	" "	Enceladus difficult.
18	7 54 30	46.24	7 54 45	30.66	10, 10	3	400	See	" "	
18	10 2 22	69.14	10 2 0	40.12	10, 10	2–3	400	See	" "	Somewhat unsteady.
19	9 34 0	256.97	9 34 0	15.72	10, 10	2	400	See	" "	Hazy; Enceladus difficult.
21	8 36 0	172.81	8 36 0	28.12	10, 10	3	400	See	" "	
22	8 35 30	69.77	8 35 0	54.32	10, 10	2	400	See	" "	
22	9 41 0	75.93	9 41 0	61.85	10, 10	3	400	See	" "	Some question as to the identification of this pair.
23	9 15 30	275.10	9 15 15	59.25	10, 10	3	400	See	" "	Hazy; Enceladus difficult.
24	8 9 0	98.89	8 9 0	18.98	10, 10	3	400	See	" "	
24	9 49 52	104.43	9 50 0	15.53	10, 10	2	400	See	" "	Blurred and unsteady.
25	9 5 8	219.23	9 5 30	16.04	10, 10	3–4	400	See	" "	
25	10 46 30	242.34	10 46 45	22.03	10, 10	3–4	400	See	" "	
27	9 42 0	280.95	9 42 0	78.35	10, 10	3	400	See	" "	
28	8 16 55	114.57	8 16 45	48.81	10, 10	3	400	See	" "	
28	9 53 22	124.88	9 53 30	38.41	10, 10	3–4	400	See	" "	
29	7 13 0	308.14	7 13 0	13.15	10, 10	4	400	See	" "	
29	9 53 0	335.48	9 53 0	7.91	10, 10	5	400	See	" "	
31	8 6 38	186.06	8 7 0	24.72	10, 10	2–3	400	See	" "	
Sept. 5	7 52 0	131.75	7 52 0	43.12	10, 10	3	400	See	" "	
5	9 52 52	158.75	9 52 30	32.33	10, 10	3	400	See	" "	
6	7 46 15	32.42	7 46 30	33.56	10, 10	3	400	See	" "	
7	7 30 0	257.04	7 30 0	49.18	10, 10	3–4	400	See	" "	
10	8 1 38	2.85	8 2 0	14.44	10, 10	2	400	See	" "	Enceladus very difficult.
1903										
June 3	15 21 53	92.67	15 22 21	70.88	8, 8	f	400	Fk.	26-inch	Enceladus difficult.
18	14 29 28	81.42	14 29 25	58.17	8, 8	p	400	Fk.	" "	Enceladus very difficult.
20	14 58 57	77.98	15 4 34	5.48	4, 4	p	400	Fk.	" "	Clouds interrupt.

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SATELLITES OF SATURN—Continued.

ENCELADUS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	h m s							
June 29	13 57 10	34.53	13 57 16	17.49	8, 8	b	400	Fk.	26-inch	Enceladus very difficult.
30	15 23 2	124.76	15 23 13	6.20	8, 8	g	400	Fk.	" "	
July 6	13 30 34	160.57	13 39 37	16.23	4, 8	p	400	Fk.	" "	
6	13 47 35	168.17	.. .. ..	.....	4, .	p	400	Fk.	" "	
15	13 10 5	116.33	13 10 26	6.58	8, 8	p	400	Fk.	" "	Enceladus very difficult.
21	11 56 39	118.06	11 56 29	32.54	8, 8	g	400	Fk.	" "	
23	11 52 9	257.18	11 52 24	55.78	8, 9	p	400	Fk.	" "	Enceladus very difficult.
24	11 57 9	94.62	11 56 58	50.02	8, 9	p	400	Fk.	" "	Enceladus very difficult.
28	12 16 22	100.49	12 16 16	77.47	8, 8	g	400	Fk.	" "	
30	11 25 20	98.93	11 24 15	7.90	10, 8	f	200	Fk.	" "	
Aug. 17	10 23 33	287.13	10 22 10	72.16	8, 8	f	400	Fk.	" "	Enceladus very difficult.
Sept. 2	9 49 50	116.62	9 49 42	39.62	8, 8	f	400	Fk.	" "	
3	9 6 40	299.67	9 6 56	9.07	9, 8	f	400	Fk.	" "	Enceladus very difficult.
4	9 56 45	89.13	9 58 8	39.34	8, 8	p	200	Fk.	" "	
10	9 41 19	135.68	9 42 0	36.81	9, 8	p	200	Fk.	" "	Enceladus difficult.
11	9 2 40	40.86	9 2 31	31.61	8, 8	g	400	Fk.	" "	Enceladus very difficult.
12	8 48 35	262.58	8 48 15	43.52	8, 8	f	400	Fk.	" "	
13	8 22 48	84.90	8 22 22	10.22	8, 9	g	400	Fk.	" "	
14	7 49 41	133.13	7 49 50	20.80	8, 8	g	400	Fk.	" "	
15	9 15 28	63.26	9 15 38	38.56	11, 8	p	200	Fk.	" "	
18	8 48 7	290.77	8 48 1	11.02	8, 8	b	400	Fk.	" "	
20	7 50 27	269.70	7 50 27	67.57	8, 8	f	400	Fk.	" "	
21	8 39 34	107.74	8 38 17	69.44	8, 8	p	400	Fk.	" "	
22	9 5 50	325.17	9 5 48	24.18	8, 8	p	400	Fk.	" "	
25	7 23 58	117.47	7 23 59	59.18	8, 8	g	400	Fk.	" "	
26	8 21 56	335.81	8 23 4	30.22	4, 4	b	200	Fk.	" "	Clouds interrupt.
29	7 6 52	113.62	7 6 34	30.34	8, 8	f	400	Fk.	" "	
30	7 9 9	336.01	7 8 16	28.24	8, 8	p	400	Fk.	" "	
Oct. 14	6 55 52	104.34	6 55 16	34.35	8, 8	f	400	Fk.	" "	
1904										
June 3	15 50 20	88.68	15 51 55	29.41	4, 4	f	400	Fk.	26-inch	
12	15 15 16	184.82	15 14 21	61.60	8, 8	f	400	Fk.	" "	Enceladus difficult.
14	14 52 28	272.14	14 51 52	12.76	8, 8	f	400	Fk.	" "	
15	15 12 42	97.01	15 17 19	56.18	4, 8	b	400	Fk.	" "	
17	15 29 53	347.87	15 29 10	17.01	8, 8	f	400	Fk.	" "	
22	14 44 15	83.04	14 44 12	49.72	8, 8	b	400	Fk.	" "	
July 3	13 50 33	8.73	13 50 41	9.49	8, 8	f	400	Fk.	" "	
14	14 4 25	255.54	14 4 16	6.39	8, 8	f	400	Fk.	" "	
19	13 33 47	92.32	13 34 13	13.12	8, 8	p	400	Hd.	" "	
20	13 36 16	277.01	13 38 53	56.50	8, 8	p	400	Hd.	" "	
26	12 54 22	7.41	13 1 50	19.78	4, 8	p	400	Hd.	" "	
26	13 8 51	17.33	.. .. ..	.....	4, .	p	400	Hd.	" "	
31	12 50 12	266.52	12 50 34	65.69	8, 8	p	400	Hd.	" "	
Aug. 3	12 32 8	88.06	12 31 58	10.10	8, 8	p	400	Hd.	" "	
12	11 10 2	84.69	11 10 9	34.35	8, 8	f	400	Hd.	" "	
16	11 41 9	91.13	11 40 46	70.77	8, 8	b	400	Hd.	" "	
21	10 34 47	282.78	10 34 55	72.38	8, 8	g	400	Hd.	" "	
23	10 56 3	276.36	10 55 52	10.26	8, 8	p	400	Hd.	" "	
24	11 19 9	95.92	11 19 4	53.93	7, 8	f	400	Hd.	" "	
Sept. 2	11 2 56	66.03	11 3 16	3.44	8, 8	g	400	Hd.	" "	
7	11 13 55	272.83	11 15 2	9.77	8, 8	e	400	Hd.	" "	Bright wires.
11	9 32 48	353.77	9 33 8	12.66	8, 8	g	400	Hd.	" "	
16	9 20 17	264.62	9 20 50	34.96	8, 9	g	400	Hd.	" "	
18	10 8 52	141.71	10 7 55	17.97	8, 8	p	400	Hd.	" "	
25	8 17 40	101.59	8 17 43	73.58	8, 8	g	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

ENCELADUS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
	h m s	°	h m s	″						
1904										
Oct. 1	8 56 40	247.66	8 56 40	22.95	8, 8	p	400	Hd.	26-inch	
3	10 20 5	119.74	10 20 6	29.07	8, 8	g	400	Hd.	" "	
6	7 56 26	91.80	7 55 41	44.76	8, 8	p	400	Hd.	" "	
7	8 19 4	262.97	8 18 59	4.62	8, 8	e	400	Hd.	" "	
9	8 50 15	263.60	8 50 21	57.99	8, 8	e	400	Hd.	" "	
10	7 59 57	95.87	8 0 56	74.64	8, 8	f	175	Hd.	" "	Bright wires.
1905										
July 10	13 49 10	277.28	13 48 59	60.26	8, 8	g	400	Hd.	26-inch	
17	13 30 52	271.01	13 30 38	60.31	8, 8	f	400	Hd.	" "	
Aug. 3	12 39 12	116.03	12 39 25	8.56	8, 8	e	400	Hd.	" "	
5	13 6 10	267.39	13 6 34	61.87	8, 8	g	400	Hd.	" "	
19	12 29 51	303.44	12 29 19	22.25	8, 8	p	400	Hd.	" "	
21	11 7 14	89.06	11 7 31	59.94	8, 8	e	400	Hd.	" "	
23	11 27 25	21.58	11 27 45	3.67	7, 8	e	400	Hd.	" "	
Sept. 3	10 24 32	282.64	10 24 49	49.51	8, 8	g	400	Hd.	" "	
7	10 58 30	304.06	10 58 43	6.28	8, 8	f	400	Hd.	" "	Enceladus very faint; poor.
8	9 42 57	148.78	9 43 13	13.65	8, 8	g	400	Hd.	" "	
9	11 2 57	85.72	11 2 47	60.10	8, 8	e	400	Hd.	" "	
14	10 13 15	276.27	10 12 53	82.02	8, 8	p	400	Hd.	" "	Enceladus very faint; poor.
16	9 29 26	310.97	9 29 33	11.47	8, 8	g	400	Hd.	" "	
18	10 52 39	279.48	10 52 56	56.52	8, 8	e	400	Hd.	" "	
25	8 58 8	266.94	8 59 39	58.23	8, 8	p	400	Hd.	" "	
30	8 26 19	97.71	8 26 19	73.44	8, 8	p	175	Hd.	" "	
Oct. 4	8 50 12	100.82	8 50 15	73.19	8, 8	f	400	Hd.	" "	
8	8 9 38	102.48	8 9 42	47.65	8, 8	e	400	Hd.	" "	
17	7 51 29	76.04	7 51 23	7.40	8, 8	e	400	Hd.	" "	
30	6 50 44	85.45	6 51 4	53.08	8, 8	e	400	Hd.	" "	
1906										
July 24	14 46 30	147.43	14 50 39	3.50	4, 8	b	400	Hd.	26-inch	
24	14 54 26	158.59	.. .. ..	.....	4, .	b	400	Hd.	" "	
30	13 59 50	274.24	14 0 2	67.67	8, 8	e	400	Hd.	" "	
Aug. 15	12 17 46	94.72	12 18 3	83.70	8, 8	e	400	Hd.	" "	
18	11 25 7	272.31	11 28 58	22.05	4, 4	g	400	Hd.	" "	
22	11 55 44	86.61	11 55 32	15.13	8, 8	f	400	Hd.	" "	
Sept. 1	11 47 0	98.70	11 47 10	18.39	8, 8	f	400	Hd.	" "	
4	11 6 47	277.31	11 6 51	79.12	8, 8	p	400	Hd.	" "	
6	11 30 22	68.88	11 29 49	5.86	8, 8	g	400	Hd.	" "	
12	11 13 10	286.06	11 13 16	15.18	8, 8	e	400	Hd.	" "	
19	9 36 33	274.01	9 36 49	82.81	8, 8	g	400	Hd.	" "	
21	9 51 14	287.33	9 51 13	12.02	8, 8	g	400	Hd.	" "	
Oct. 13	8 35 40	99.44	8 35 51	56.35	4, 4	g	400	Hd.	" "	
15	7 31 20	245.19	7 31 25	15.73	6, 6	f	400	Hd.	" "	Satellites very faint.
1907										
Aug. 4	14 11 38	275.49	14 11 35	70.23	8, 8	e	400	Hd.	26-inch	
7	13 36 34	94.99	13 36 22	2.26	4, 4	g	400	Hd.	" "	
11	12 17 5	278.39	12 16 53	13.52	4, 4	g	400	Hd.	" "	Tethys touching ring: difficult.
18	14 17 34	100.24	14 17 13	11.28	8, 8	f	400	Hd.	" "	
20	11 31 42	95.16	11 31 51	80.05	8, 8	e	400	Hd.	" "	
25	12 18 57	273.90	12 18 35	61.97	4, 4	f	400	Hd.	" "	
Sept. 7	11 10 4	278.08	11 10 8	14.30	8, 8	g	400	Hd.	" "	
13	10 33 7	275.14	10 33 4	68.87	8, 8	e	400	Hd.	" "	
20	10 35 50	274.57	10 36 1	60.76	8, 9	g	400	Hd.	" "	
26	11 17 34	278.85	11 17 30	8.53	8, 8	g	400	Hd.	" "	
29	10 21 28	95.24	10 21 15	63.96	8, 8	f	400	Hd.	" "	
Oct. 1	10 13 54	268.76	10 13 56	7.96	8, 8	e	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

ENCELADUS–TETHYS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	h m s	"						
Oct. 5	11 41 26	274.02	11 41 16	54.61	8, 8	p	400	Hd.	26-inch	
9	10 12 32	274.76	10 12 33	71.67	8, 8	f	400	Hd.	" "	
10	9 48 16	94.98	9 48 5	65.53	8, 8	f	400	Hd.	" "	
16	9 30 3	131.36	9 30 2	1.81	4, 4	g	400	Hd.	" "	
19	7 32 20	276.10	7 32 35	52.84	8, 8	f	400	Hd.	" "	
Nov. 16	6 56 22	275.68	6 56 29	9.76	8, 8	g	400	Hd.	" "	

TETHYS–DIONE.

1895										
Mar. 22	13 42 36	270.55	13 42 30	61.22	8, 4	3	400	Br.	26-inch	
28	12 47 48	299.57	12 56 12	34.63	4, 5	..	400	Br.	" "	Clouds interrupt.
Apr. 3	12 14 12	249.03	12 15 0	46.40	8, 5	..	400	Br.	" "	
11	12 57 36	274.23	12 58 12	29.36	8, 5	3	400	Br.	" "	
15	12 23 30	159.11	12 24 0	24.14	8, 8	3	400	Br.	" "	Unsteady and thick.
17	11 32 36	329.56	11 33 0	8.79	6, 4	4	400	Br.	" "	
18	11 4 6	101.35	11 4 12	57.97	8, 8	4	400	Br.	" "	
19	11 53 12	274.46	12 4 36	97.21	7, 4	2	400	Br.	" "	Planet jumping badly.
23	10 57 6	78.19	10 58 12	16.97	7, 6	2	400	Br.	" "	Wind shakes telescope.
May 4	10 30 12	121.89	10 30 30	23.31	8, 8	5	400	Br.	" "	
5	10 27 0	249.86	10 33 48	10.23	4, 4	4	400	Br.	" "	Clouds interrupt.
7	10 15 48	97.93	10 26 0	82.89	4, 6	..	400	Br.	" "	Clouds interrupt.
9	9 41 30	82.83	9 49 48	85.28	4, 4	3	400	Br.	" "	
10	9 7 12	69.30	9 8 0	36.10	7, 6	3	400	Br.	" "	
18	8 35 0	89.21	8 47 0	44.76	4, 8	2	400	Br.	" "	Wind shakes telescope.
20	8 54 0	70.03	9 4 30	70.24	4, 6	2	400	Br.	" "	Cloudy and thick.
22	8 6 30	318.13	8 16 48	22.31	4, 6	2	400	Br.	" "	
23	9 7 0	95.65	9 15 12	15.58	4, 6	3	400	Br.	" "	Thick; images steady but faint.
28	10 40 30	83.91	10 52 12	60.17	4, 6	..	400	Br.	" "	
29	9 16 48	224.16	9 27 30	7.64	4, 4	2	400	Br.	" "	Diffuse and unsteady.
June 1	8 53 0	157.14	9 4 12	29.95	4, 8	3	400	Br.	" "	Thick; Dione very faint.
3	10 29 30	105.40	10 40 30	46.44	4, 6	3	400	Br.	" "	
6	8 22 48	86.95	8 32 30	73.88	4, 6	3	400	Br.	" "	Unsteady; bright moonlight.
7	9 20 30	261.63	9 31 0	90.86	4, 6	3	400	Br.	" "	
1896										
May 4	12 8 36	352.50	12 9 12	5.51	6, 4	..	400	Br.	26-inch	Unsteady.
9	11 9 48	323.86	11 10 0	23.90	6, 4	..	400	Br.	" "	Unsteady and thick.
10	10 52 30	88.68	10 53 0	13.49	6, 4	..	400	Br.	" "	
11	11 22 0	126.68	11 22 30	27.11	6, 4	..	400	Br.	" "	Steady but thick.
14	11 36 24	267.79	11 35 30	92.98	6, 4	4	400	Br.	" "	Steady but thick.
15	9 57 30	71.74	9 57 48	47.14	6, 4	2	400	Br.	" "	Wind shakes telescope.
16	9 52 24	153.64	9 53 0	7.13	6, 4	3	400	Br.	" "	
27	10 40 30	197.54	10 48 30	24.53	3, 4	2	400	Br.	" "	Clouds interrupt.
29	11 6 54	356.90	11 7 0	12.95	6, 4	2	400	Br.	" "	Parallel uncertain.
30	9 48 6	112.27	9 49 12	54.48	6, 4	2	400	Br.	" "	Parallel uncertain.
June 1	10 40 12	93.44	10 41 48	97.30	6, 4	3	400	Br.	" "	
5	10 12 0	239.09	10 13 0	41.59	6, 4	3–4	400	Br.	" "	
11	9 41 0	272.39	9 42 0	69.12	6, 4	2	400	Br.	" "	
12	10 12 0	84.46	10 13 54	93.42	6, 4	3	400	Br.	" "	Clouds; satellites faint.
15	9 24 36	151.18	9 24 30	14.00	6, 4	3	400	Br.	" "	
20	9 15 30	89.45	9 16 0	79.80	6, 4	3	400	Br.	" "	
26	10 2 54	132.82	10 3 48	37.75	6, 4	2	400	Br.	" "	
29	9 58 6	101.36	9 59 12	52.35	6, 4	2	400	Br.	" "	
30	9 24 0	270.50	9 25 12	89.65	6, 4	3	400	Br.	" "	Unsteady.
July 1	8 25 0	79.26	8 25 30	86.97	6, 4	4	400	Br.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–DIONE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1900	h m s	°	h m s	″						
May 20	13 18 48	90.91	13 18 30	95.92	10, 10	3–4	400	See	26-inch	
21	14 11 12	261.85	14 11 30	63.66	10, 10	2–3	400	See	" "	
22	12 42 30	37.24	12 43 30	16.06	10, 10	3	400	See	" "	Hazy; very difficult.
30	12 25 24	269.87	12 25 12	63.02	10, 10	2–3	400	See	" "	
June 4	12 11 48	215.33	12 11 42	9.25	10, 10	3–4	400	See	" "	
5	12 25 42	306.67	12 26 12	43.93	10, 10	3–4	400	See	" "	
6	12 34 42	109.75	12 38 12	85.15	5, 10	4	400	See	" "	Clouds interrupt.
7	13 16 12	280.72	13 17 0	100.31	10, 10	4	400	See	" "	Dense haze; satellites faint.
8	12 39 36	88.42	12 40 0	80.38	10, 10	2–3	400	See	" "	
11	11 50 30	54.92	11 54 12	34.40	5, 5	2	400	See	" "	Clouds interrupt.
19	12 2 6	74.27	12 3 0	80.53	10, 10	2–3	400	See	" "	
20	11 27 24	225.93	11 28 0	47.76	10, 10	2–1	400	See	" "	Hazy and blurred.
23	11 40 42	149.92	.. .. ..	.. ..	4, ..	2	400	See	" "	Clouds interrupt.
30	10 19 24	215.32	10 19 12	40.39	10, 10	2	400	See	" "	
July 1	11 17 0	178.58	11 18 0	44.77	10, 10	2–3	400	See	" "	
2	10 10 12	310.13	10 10 12	61.98	10, 10	3	400	See	" "	
7	10 36 36	262.18	10 37 12	89.92	10, 10	2–3	400	See	" "	Clouds troubling.
9	9 45 0	21.06	9 50 30	29.86	5, 5	2–3	400	See	" "	Clouds interrupt.
11	9 31 36	359.62	9 31 48	15.35	10, 10	3–4	400	See	" "	
13	10 51 24	295.93	10 51 42	82.84	10, 10	3–1	400	See	" "	
14	10 26 36	102.35	10 27 0	94.91	10, 10	4–5	400	See	" "	
15	10 15 24	270.64	10 15 0	68.25	10, 10	4	400	See	" "	
16	10 30 36	67.44	10 30 48	19.33	10, 10	3	400	See	" "	
17	9 52 36	87.39	9 52 30	29.06	10, 10	4	400	See	" "	
27	10 12 12	62.06	10 12 12	50.02	10, 10	4–5	400	See	" "	
28	9 25 24	175.90	9 25 42	15.45	10, 10	2	400	See	" "	Blurred.
30	9 30 48	338.36	9 31 30	32.16	10, 10	2–3	400	See	" "	
31	9 3 30	123.40	9 3 30	69.21	10, 10	2	400	See	" "	Blurred.
Aug. 3	9 22 12	263.37	9 22 12	36.09	10, 10	3	400	See	" "	
4	8 53 6	284.55	8 53 12	17.04	10, 10	2–3	400	See	" "	
5	8 58 48	76.67	8 58 30	49.83	10, 10	2	400	See	" "	
8	8 37 24	143.06	8 37 42	45.31	10, 10	3–4	400	See	" "	
9	8 23 0	294.38	8 23 12	37.07	10, 10	2–3	400	See	" "	
10	8 24 6	13.57	8 24 30	7.25	10, 10	2	400	See	" "	
11	8 39 24	109.06	8 39 30	52.03	10, 10	2–1	400	See	" "	Very unsteady and hazy.
15	8 30 0	40.17	8 30 12	24.76	10, 10	2	400	See	" "	
17	8 46 42	197.43	8 46 42	23.66	10, 10	3–4	400	See	" "	
18	8 32 42	323.16	8 33 12	49.10	10, 10	2	400	See	" "	Very hazy.
19	8 30 6	119.02	8 30 0	76.48	10, 10	3	400	See	" "	
25	8 35 24	228.64	8 35 30	53.94	10, 10	3–4	400	See	" "	
28	8 29 24	269.57	8 29 30	13.01	10, 10	2–3	400	See	" "	
30	9 0 36	108.10	9 1 12	74.93	10, 10	3	400	See	" "	
31	8 18 42	274.90	8 19 0	95.89	10, 10	2–3	600	See	" "	
Sept. 1	7 45 48	81.33	7 47 0	79.06	10, 10	3	400	See	" "	
2	8 15 12	246.37	8 15 30	40.50	10, 10	3–4	400	See	" "	
4	7 14 30	47.09	7 14 30	20.67	10, 10	3	400	See	" "	
5	7 20 0	166.18	7 21 0	34.94	10, 10	3	400	See	" "	
6	7 26 0	311.96	7 25 30	61.35	10, 10	2	400	See	" "	
1901										
Apr. 16	16 32 0	78.74	16 32 54	8.98	10, 10	3	400	See	26-inch	
26	15 5 24	287.25	15 5 48	80.90	10, 10	1–2	400	See	" "	Tremulous.
27	15 10 30	96.34	15 11 0	57.72	10, 10	2	400	See	" "	Blurred.
28	15 17 36	244.23	15 18 0	11.04	10, 10	4	400	See	" "	
29	14 39 0	271.49	14 39 0	36.92	10, 10	3–4	400	See	" "	
May 3	14 50 54	140.02	14 51 0	35.20	10, 10	3	400	See	" "	Moonlight; satellites difficult

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SATELLITES OF SATURN—Continued.

TETHYS-DIONE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	″						
May 4	15 18 36	287.30	15 18 30	18.77	10, 10	4	400	See	26-inch	
5	15 24 30	310.46	15 24 0	22.58	10, 10	1–2	400	See	" "	
6	15 19 36	287.14	15 19 30	68.44	10, 10	3–1	400	See	" "	Satellites extremely difficult.
11	16 1 12	73.34	16 0 24	24.44	10, 10	1–2	400	See	" "	Unsteady.
13	14 17 48	316.58	14 18 12	54.40	10, 10	4	400	See	" "	
14	15 1 36	119.60	15 1 48	71.04	10, 10	4	400	See	" "	
15	14 41 36	284.86	14 42 0	66.15	10, 10	4	400	See	" "	
22	14 20 36	125.53	14 20 36	23.18	10, 10	2	400	See	" "	
23	14 18 0	173.35	14 17 48	9.72	10, 10	4	400	See	" "	
28	13 53 48	238.70	13 54 6	23.15	10, 10	2	400	See	" "	
June 3	12 33 24	276.67	12 33 48	44.37	10, 10	3	400	See	" "	
4	12 54 24	308.61	12 54 30	10.36	10, 10	3–4	400	See	" "	
9	12 48 48	327.49	12 48 54	24.92	10, 10	2	400	See	" "	
10	12 44 48	78.84	12 44 36	10.47	10, 10	3–4	400	See	" "	
18	12 15 24	20.52	12 15 30	36.43	10, 10	3–4	400	See	" "	
19	12 38 24	152.34	12 39 0	48.85	7, 10	3	400	See	" "	
23	12 29 12	282.04	12 29 30	46.18	10, 10	1–2	400	See	" "	Very much blurred.
24	12 7 36	39.45	12 7 42	25.09	10, 10	3–4	400	See	" "	
27	11 4 6	174.24	11 5 0	27.20	10, 10	2–3	400	See	" "	
28	11 1 48	293.69	11 2 24	16.28	10, 10	2–3	400	See	" "	Fuzzy and hazy.
30	10 21 54	114.55	10 22 42	66.63	10, 10	2–3	400	See	" "	Hazy; bright moonlight.
July 1	10 47 0	284.08	10 46 24	97.05	10, 10	..	400	See	" "	Near the Moon; satellites difficult.
3	10 33 0	261.81	10 32 36	59.29	10, 10	2	400	See	" "	
5	11 9 42	79.95	11 10 6	30.90	10, 10	2–3	400	See	" "	
9	11 3 0	306.48	11 3 30	56.09	10, 10	2–3	400	See	" "	
10	10 8 42	95.17	10 9 0	27.43	10, 10	2–3	400	See	" "	
15	10 5 30	33.16	10 5 48	34.79	10, 10	4	400	See	" "	
20	10 4 24	282.10	10 4 42	98.06	10, 10	2–3	400	See	" "	
21	9 51 0	90.93	9 51 30	76.22	10, 10	2	400	See	" "	
23	9 31 18	273.95	9 31 36	21.44	10, 10	3	400	See	" "	
28	8 22 54	284.80	8 23 12	40.34	10, 10	2	400	See	" "	
29	9 15 0	317.32	9 15 12	10.63	10, 10	3	400	See	" "	
30	9 36 36	101.82	9 37 24	61.63	10, 10	1–2	400	See	" "	
31	8 16 24	267.20	8 16 48	87.39	10, 10	3	400	See	" "	
Aug. 1	10 45 0	83.87	10 45 12	91.59	10, 10	4	400	See	" "	
2	9 33 36	241.21	9 33 42	52.38	10, 10	3	400	See	" "	
7	9 23 42	110.63	9 23 30	89.41	10, 10	4	400	See	" "	
8	9 52 30	281.39	9 53 42	82.60	10, 10	4	400	See		
9	9 14 42	86.97	9 15 0	45.28	10, 10	3	400	See	" "	
13	9 45 54	209.31	9 46 6	46.10	10, 10	1–2	400	See	" "	Thick.
16	8 14 42	254.66	8 14 54	9.52	10, 10	3–4	400	See	" "	
18	10 8 36	102.06	10 11 0	84.92	5, 5	2–1	400	See	" "	Clouds interrupt.
19	8 54 12	268.34	8 54 6	95.23	10, 10	2	400	See	" "	Clouds.
20	8 41 36	75.07	8 41 30	70.49	10, 10	4	400	See	" "	
21	8 18 30	225.20	8 18 36	29.59	10, 10	3–4	400	See	" "	
22	9 22 0	300.41	9 22 0	10.95	10, 10	3	400	See	" "	
26	7 48 12	104.92	7 48 12	86.12	10, 10	3–4	400	See	" "	
27	7 25 48	272.76	7 25 48	59.89	10, 10	3	400	See	" "	
28	7 39 36	57.82	7 39 30	11.30	10, 10	3–4	400	See	" "	Trembling and unsteady.
29	8 20 18	90.97	8 20 30	39.34	10, 10	5	400	See	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–DIONE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	″						
Aug. 30	7 44 18	251.28	7 44 42	57.18	10, 10	4	400	See	26-inch	
Sept. 3	8 7 42	105.25	8 7 30	18.88	10, 10	3	400	See	" "	
4	8 3 36	125.09	8 3 42	24.97	10, 10	3	400	See	" "	
5	7 45 0	285.05	7 45 12	70.84	10, 10	2–3	400	See	" "	
6	8 12 54	95.94	8 13 30	95.49	10, 10	4–5	400	See	" "	
7	7 30 24	262.90	7 30 30	82.96	10, 10	3–4	400	See	" "	
9	7 6 42	176.24	7 8 0	11.51	10, 10	3–4	400	See	" "	
11	6 55 12	347.20	6 55 30	30.98	10, 10	2–3	400	See	" "	
12	8 3 0	138.78	8 3 18	54.51	10, 10	2	400	See	" "	Unsteady.
20	6 55 12	160.33	6 56 30	33.63	10, 10	2–3	400	See	" "	
1902										
Apr. 30	15 46 52	156.87	15 46 30	30.52	10, 10	2	400	See	26-inch	
May 1	16 12 12	306.79	16 12 15	58.10	10, 10	2	400	See	" "	
4	15 23 0	83.94	15 23 0	19.44	10, 10	2	400	See	" "	
5	15 23 38	94.70	15 23 24	31.40	10, 10	2–3	400	See	" "	
6	15 14 45	260.86	15 14 30	58.23	10, 10	2–3	400	See	" "	
9	14 54 30	322.54	14 54 30	33.72	10, 10	2–3	400	See	" "	
15	14 52 0	258.42	14 52 15	56.38	10, 10	2–3	400	See	" "	Very hazy; satellites difficult.
21	14 6 0	105.04	14 6 30	72.79	10, 10	3–4	400	See	" "	
25	14 58 30	258.79	14 58 30	72.85	10, 10	1–2	400	See	" "	Unsteady.
28	13 57 30	307.47	13 57 30	26.59	10, 10	2–3	400	See	" "	
29	13 38 30	45.26	13 38 30	6.21	10, 10	2–3	400	See	" "	
30	13 57 30	115.62	13 57 30	44.77	10, 10	2	400	See	" "	Hazy and unsteady.
June 1	13 54 38	95.55	13 54 45	99.31	10, 10	5	400	See	" "	
4	13 50 52	96.78	13 51 0	13.66	10, 10	1–2	400	See	" "	Very much blurred.
5	13 54 45	234.45	13 54 30	28.29	10, 10	2–3	400	See	" "	
6	13 34 15	352.09	13 34 30	34.04	10, 10	2–3	400	See	" "	Very hazy; satellites difficult.
8	13 32 30	293.84	13 32 30	71.20	10, 10	3	400	See	" "	
9	13 28 8	101.92	13 28 15	49.90	10, 10	2	400	See	" "	Hazy and blurred.
10	13 23 8	190.54	13 23 15	4.07	10, 10	3	400	See	" "	Blurred.
11	13 34 0	275.75	13 39 30	50.45	5, 5	2–3	400	See	" "	Clouds interrupt.
21	11 37 0	256.17	11 37 30	46.27	10, 10	2–3	400	See	" "	Unsteady.
23	11 48 0	68.47	11 48 0	26.88	10, 10	3	400	See	" "	
24	11 56 30	201.96	11 56 45	31.25	10, 10	2–3	400	See	" "	
July 11	10 32 45	263.40	10 32 51	23.97	10, 10	2–3	400	See	" "	
12	10 57 0	54.28	10 57 0	37.70	10, 10	2–3	400	See	" "	
13	10 50 12	181.38	10 50 30	38.29	10, 10	3	400	See	" "	
14	10 34 52	315.12	10 35 0	56.64	10, 10	3	400	See	" "	
15	10 46 52	116.48	10 47 0	61.13	10, 10	2–1	400	See	" "	Very unsteady.
16	10 54 15	281.63	10 54 0	33.79	10, 10	3–4	400	See	" "	
22	9 55 0	330.30	9 55 0	19.14	10, 10	2–3	400	See	" "	
31	9 17 0	32.44	9 17 0	39.35	10, 10	3–4	400	See	" "	
Aug. 2	9 11 0	305.74	9 11 30	58.20	10, 10	2–3	400	See	" "	Hazy; thin clouds interrupt.
3	9 8 0	109.13	9 8 0	45.21	10, 10	3	400	See	" "	Clouds.
5	10 29 0	285.13	10 29 0	53.39	10, 10	2	400	See	" "	Clouds.
7	9 3 15	260.66	9 3 0	85.26	10, 10	1–2	400	See	" "	Very much blurred.
8	8 48 30	61.45	8 48 30	53.27	10, 10	2–3	400	See	" "	Blurred.
12	8 56 0	124.50	8 56 0	59.67	10, 10	2	400	See	" "	Very hazy.
16	7 57 37	6.72	7 58 0	5.37	10, 10	1–2	400	See	" "	
17	8 47 0	82.27	8 47 0	40.12	10, 10	2–3	400	See	" "	
18	8 0 0	235.29	8 0 0	45.60	10, 10	3	400	See	" "	
18	10 8 38	249.90	10 9 0	58.92	10, 10	2–3	400	See	" "	
19	9 19 30	31.14	9 19 45	43.23	10, 10	2	400	See	" "	Hazy and unsteady.
20	9 46 15	163.05	9 47 0	39.59	10, 10	2	400	See	" "	Blurred.
21	8 3 0	298.60	8 3 0	47.64	10, 10	3	400	See	" "	
22	8 17 38	95.75	8 18 0	16.65	10, 10	2–3	400	See	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–DIONE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
Aug. 23	8 27 52	110.84	8 28 0	35.39	10, 10	3	400	See	26–inch	Hazy.
24	7 59 0	277.20	7 59 0	79.66	10, 10	3	400	See	" "	
25	8 25 52	89.51	8 25 30	95.41	10, 10	3	400	See	" "	
27	9 22 15	62.02	9 22 0	37.51	10, 10	3	400	See	" "	
28	8 23 52	140.15	8 24 0	11.22	10, 10	3	400	See	" "	
29	9 42 22	230.35	9 42 15	20.13	10, 10	5	400	See	" "	
30	8 8 15	324.74	8 8 0	38.51	10, 10	2–3	400	See	" "	Hazy and fuzzy.
31	8 0 0	119.42	8 0 0	74.08	10, 10	2–3	400	See	" "	Hazy and unsteady.
Sept. 4	7 43 0	272.38	7 43 0	30.99	10, 10	2	400	See	" "	Unsteady.
5	7 29 0	73.54	7 29 15	54.42	10, 10	3	400	See	" "	
6	7 38 30	229.60	7 38 30	49.69	10, 10	3	400	See	" "	
7	7 46 22	4.01	7 46 0	38.67	10, 10	3–4	400	See	" "	
10	7 52 0	310.33	7 52 0	16.39	10, 10	2–3	400	See	" "	Unsteady and blurred.
11	8 21 15	107.66	8 21 0	64.46	10, 10	2–3	400	See	" "	Hazy.
1903										
May 9	16 10 23	102.18	16 9 46	67.29	10, 10	p	400	Fk.	26-inch	
10	15 51 53	271.24	15 51 48	27.19	10, 10	..	400	Fk.	" "	Fuzzy.
13	16 21 4	256.24	16 21 3	61.20	8, 8	g	400	Fk.	" "	
June 2	15 18 28	31.88	15 18 19	27.36	8, 8	f	400	Fk.	" "	
3	14 33 36	130.97	14 33 45	23.79	8, 8	p	400	Fk.	" "	
18	14 7 47	270.04	14 7 47	42.22	8, 8	f	400	Fk.	" "	
20	13 19 16	231.74	13 19 29	38.34	8, 8	p	400	Fk.	" "	
21	14 0 40	355.17	14 0 39	18.79	8, 8	p	400	Fk.	" "	
29	12 56 32	259.37	12 56 33	26.94	8, 8	g	400	Fk.	" "	
30	12 38 55	44.32	12 38 40	30.02	8, 8	f	400	Fk.	" "	
July 6	14 50 43	99.13	14 50 50	76.96	8, 8	p	400	Fk.	" "	
7	13 41 14	268.59	13 41 8	90.52	8, 8	b	400	Fk.	" "	
8	14 50 55	82.48	14 51 4	77.28	8, 8	f	400	Fk.	" "	
9	14 36 1	241.52	14 36 11	34.54	8, 8	b	400	Fk.	" "	
15	11 45 56	272.23	11 46 12	75.37	8, 8	p	400	Fk.	" "	
18	11 57 50	249.30	11 58 5	40.13	8, 8	p	400	Fk.	" "	
21	11 3 1	296.32	11 3 2	60.73	8, 8	g	400	Fk.	" "	
23	10 30 16	126.34	10 31 21	9.33	8, 8	b	400	Fk.	" "	
24	11 21 31	279.24	11 21 20	61.62	8, 8	f	400	Fk.	" "	
27	11 44 20	66.55	11 42 42	46.37	8, 8	b	600	Fk.	" "	
28	12 38 27	201.16	12 38 20	13.83	8, 8	g	400	Fk.	" "	
30	13 17 7	358.02	13 16 10	21.45	8, 8	p	200	Fk.	" "	
Aug. 9	10 44 18	292.75	10 44 9	42.97	8, 8	p	400	Fk.	" "	
17	10 50 15	203.33	10 50 23	16.78	9, 8	f	400	Fk.	" "	
18	10 13 39	312.89	10 13 10	45.31	9, 8	f	400	Fk.	" "	
20	10 40 2	285.17	10 40 26	88.51	8, 8	f	400	Fk.	" "	
21	9 43 26	94.55	9 43 34	62.70	8, 8	p	400	Fk.	" "	
22	10 58 57	249.84	10 59 0	9.48	9, 8	b	400	Fk.	" "	Clouds.
23	10 45 18	271.09	10 46 28	40.59	8, 8	b	400	Fk.	" "	
24	10 1 24	75.48	10 0 58	56.35	8, 8	b	400	Fk.	" "	
Sept. 2	8 19 14	243.40	8 19 4	38.04	8, 8	f	400	Fk.	" "	
3	8 5 8	334.34	8 5 0	10.35	8, 8	g	400	Fk.	" "	
10	8 55 20	97.61	8 55 26	25.97	8, 8	f	400	Fk.	" "	
11	8 19 38	261.82	8 19 50	55.58	8, 8	g	400	Fk.	" "	
12	8 23 51	64.43	8 23 40	53.70	8, 8	b	400	Fk.	" "	
20	8 23 19	81.45	8 23 33	61.69	8, 8	f	400	Fk.	" "	
1904										
June 12	15 40 33	100.28	15 40 26	96.39	8, 8	p	400	Fk.	26-inch	
14	15 20 56	87.18	15 20 43	47.59	8, 8	f	400	Fk.	" "	
17	15 2 42	44.92	15 2 10	22.86	8, 8	f	400	Fk.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–DIONE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	″						
June 18	14 39 13	135.92	14 40 0	34.66	8, 8	p	400	Fk.	26-inch	
22	14 19 13	281.59	14 18 42	35.42	8, 8	b	400	Fk.	" "	
23	14 8 46	93.02	14 8 33	73.33	8, 8	f	400	Fk.	" "	
July 3	13 25 54	73.48	13 25 44	15.72	8, 8	f	400	Fk.	" "	
13	13 53 11	264.11	13 52 39	74.34	9, 8	b	400	Fk.	" "	
14	14 26 11	71.30	14 25 52	38.23	8, 8	f	400	Fk.	" "	
19	13 58 26	283.06	.. .. ..	.....	8, .	p	400	Hd.	" "	
20	13 6 55	95.67	13 7 30	83.31	8, 8	b	400	Hd.	" "	
26	12 42 1	119.54	12 42 51	46.80	8, 8	p	400	Hd.	" "	
31	12 31 53	88.88	12 31 46	90.97	8, 8	p	400	Hd.	" "	
Aug. 3	11 32 42	95.26	11 32 25	13.09	8, 8	p	400	Hd.	" "	
12	11 32 22	214.72	11 32 40	29.20	8, 8	g	400	Hd.	" "	
15	10 50 35	271.15	10 50 57	17.29	8, 8	g	400	Hd.	" "	
16	10 55 18	257.88	10 55 22	35.71	8, 8	b	400	Hd.	" "	
21	10 22 13	303.48	10 22 37	10.38	8, 8	g	400	Hd.	" "	
23	10 42 6	133.61	10 42 36	33.51	8, 8	p	400	Hd.	" "	
24	9 58 20	260.44	9 58 37	77.32	8, 8	f	400	Hd.	" "	
28	10 27 51	94.98	10 28 14	32.98	8, 8	p	400	Hd.	" "	
Sept. 2	9 20 39	101.98	9 20 38	28.72	8, 8	g	400	Hd.	" "	
5	10 11 4	96.96	10 10 22	99.03	8, 8	b	400	Hd.	" "	
7	11 30 36	84.76	11 30 27	59.00	8, 8	e	400	Hd.	" "	
10	9 36 40	354.07	9 36 40	19.07	7, 8	p	400	Hd.	" "	
11	9 3 42	120.57	9 3 54	55.56	8, 8	g	400	Hd.	" "	
16	8 35 8	87.85	8 35 25	53.35	9, 9	f	400	Hd.	" "	
17	8 30 1	253.80	8 30 21	53.92	8, 8	g	400	Hd.	" "	
18	9 30 1	54.17	9 30 27	38.03	8, 8	f	400	Hd.	" "	
21	8 58 53	36.79	8 58 37	5.70	8, 8	b	400	Hd.	" "	
23	8 37 13	280.12	8 37 7	89.91	8, 9	b	400	Hd.	" "	
25	8 51 30	266.54	8 51 47	71.07	8, 8	g	400	Hd.	" "	
Oct. 1	9 19 13	288.13	9 19 43	70.46	8, 8	p	400	Hd.	" "	
3	10 9 3	166.74	10 9 28	4.50	8, 8	g	400	Hd.	" "	
4	7 34 41	273.69	7 34 30	46.81	8, 8	..	400	Hd.	" "	
6	8 35 23	252.92	8 35 27	56.49	8, 8	f	400	Hd.	" "	
7	6 59 43	0.64	6 59 48	24.07	8, 8	g	400	Hd.	" "	
9	8 10 38	272.92	8 11 35	13.17	8, 8	e	400	Hd.	" "	
10	7 2 11	296.84	7 2 20	29.51	8, 8	f	400	Hd.	" "	
1905										
July 9	13 48 36	263.26	13 48 40	24.74	8, 8	e	400	Hd.	26-inch	
17	12 36 28	96.10	12 37 4	59.83	8, 8	f	400	Hd.	" "	
18	13 18 29	272.55	13 18 41	87.62	8, 8	f	400	Hd.	" "	
25	12 14 2	98.47	12 14 15	100.41	8, 8	b	400	Hd.	" "	
26	13 1 29	275.21	13 1 35	89.10	8, 8	g	400	Hd.	" "	
Aug. 1	13 56 35	301.69	13 56 22	31.80	8, 8	g	400	Hd.	" "	
3	12 48 42	266.66	12 48 47	9.80	8, 8	e	400	Hd.	" "	
5	13 29 18	96.29	13 29 20	89.22	8, 8	g	400	Hd.	" "	
21	11 52 11	98.99	11 52 13	23.33	8, 8	e	400	Hd.	" "	
23	12 28 10	279.24	12 28 18	76.56	8, 8	e	400	Hd.	" "	
27	11 8 28	151.40	11 8 47	7.22	8, 8	g	400	Hd.	" "	
31	11 6 22	281.76	11 6 32	88.87	8, 8	p	400	Hd.	" "	
Sept. 3	10 34 5	278.13	10 34 28	25.45	8, 8	g	400	Hd.	" "	
7	10 47 42	126.75	10 47 57	28.17	8, 8	f	400	Hd.	" "	
8	9 52 44	283.99	9 52 37	32.10	8, 8	g	400	Hd.	" "	
9	11 12 44	314.22	11 12 50	6.19	8, 8	e	400	Hd.	" "	
15	10 31 40	93.65	10 31 52	15.92	8, 8	e	400	Hd.	" "	
16	9 41 18	194.24	9 41 29	10.99	8, 8	g	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–DIONE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1905	h m s	°	h m s	″						
Sept. 18	11 4 18	109.66	11 4 23	64.99	8, 8	e	400	Hd.	26-inch	
24	9 9 20	244.35	9 9 19	35.96	8, 8	f	400	Hd.	" "	
25	9 21 35	344.18	9 21 37	18.76	8, 8	p	400	Hd.	" "	
26	9 0 5	113.02	9 0 11	30.08	8, 8	e	400	Hd.	" "	
30	8 38 38	274.36	8 38 48	102.09	8, 8	p	400	Hd.	" "	
Oct. 1	8 32 9	88.80	8 32 46	77.47	8, 8	f	400	Hd.	" "	
4	9 2 34	72.18	9 2 51	19.44	8, 8	g	400	Hd.	" "	
5	8 56 44	153.86	8 57 26	18.97	8, 8	p	400	Hd.	" "	
7	8 25 12	103.56	8 25 20	77.36	8, 8	e	400	Hd.	" "	
8	7 59 56	276.90	8 0 4	60.15	8, 8	g	400	Hd.	" "	
14	7 30 48	305.90	7 30 57	24.68	8, 8	g	400	Hd.	" "	
16	7 31 3	114.33	7 31 43	19.65	8, 8	f	400	Hd.	" "	
17	8 7 59	283.09	8 7 43	66.53	8, 8	e	400	Hd.	" "	
30	7 0 53	265.24	7 1 9	69.05	8, 8	e	400	Hd.	" "	
1906										
July 30	13 38 20	99.60	13 38 28	55.39	4, 4	e	400	Hd.	26-inch	
Aug. 15	12 29 19	107.49	12 29 28	10.21	8, 8	e	400	Hd.	" "	
18	11 38 38	98.54	11 38 36	82.17	8, 8	g	400	Hd.	" "	
22	12 5 19	273.35	12 5 30	31.50	8, 8	f	400	Hd.	" "	
Sept. 5	11 30 15	283.70	11 30 7	52.04	8, 8	f	400	Hd.	" "	
6	11 56 6	99.78	11 56 10	81.58	8, 8	g	400	Hd.	" "	
12	11 53 27	257.02	11 53 24	31.75	8, 8	e	400	Hd.	" "	
19	9 54 57	90.13	9 55 14	67.62	8, 8	g	400	Hd.	" "	
21	10 2 23	276.70	10 2 38	13.08	8, 8	g	400	Hd.	" "	
Oct. 7	9 26 5	272.83	9 26 13	88.53	8, 8	f	400	Hd.	" "	
12	9 2 26	108.66	9 2 37	45.65	8, 8	e	400	Hd.	" "	
13	8 41 44	281.08	8 41 41	75.88	4, 4	g	400	Hd.	" "	
14	8 10 42	97.19	8 10 45	67.49	6, 6	e	400	Hd.	" "	
1907										
Aug. 4	14 25 56	15.98	14 27 5	0.80	2, 4	e	400	Hd.	26-inch	
4	14 28 35	8.10	.. .. ..	.....	2, .	e	400	Hd.	" "	
6	13 34 18	93.47	13 34 9	88.39	8, 8	e	400	Hd.	" "	
7	13 15 35	274.60	13 15 50	97.73	8, 8	e	400	Hd.	" "	
18	13 37 29	274.84	13 37 11	101.18	8, 8	f	400	Hd.	" "	
20	11 2 24	281.84	11 2 5	18.50	8, 8	g	400	Hd.	" "	
25	11 54 57	94.33	11 54 49	98.37	8, 8	f	400	Hd.	" "	
26	11 45 57	275.15	11 45 48	80.89	8, 8	e	400	Hd.	" "	
Sept. 5	11 19 53	94.66	11 19 56	98.40	8, 8	f	400	Hd.	" "	
6	11 6 16	275.26	11 6 17	92.86	8, 10	p	400	Hd.	" "	
8	11 30 58	283.67	11 31 7	8.78	8, 8	e	400	Hd.	" "	
12	10 59 42	274.55	10 59 29	87.04	8, 8	p	400	Hd.	" "	
13	10 53 29	94.87	10 53 32	88.93	8, 8	e	400	Hd.	" "	
14	10 54 52	275.70	10 54 52	50.20	8, 8	e	400	Hd.	" "	
20	10 46 13	274.20	10 46 22	33.65	8, 8	g	400	Hd.	" "	
29	11 53 42	282.76	11 53 46	3.90	8, 8	f	400	Hd.	" "	
30	9 53 54	95.19	9 53 59	66.59	8, 8	p	400	Hd.	" "	
Oct. 1	10 22 14	275.14	10 22 15	83.46	8, 8	e	400	Hd.	" "	
2	9 24 15	95.34	9 24 35	65.94	8, 8	g	400	Hd.	" "	
6	10 44 40	274.28	10 44 41	60.36	8, 8	f	400	Hd.	" "	
9	10 26 18	274.02	10 26 0	18.81	8, 8	g	400	Hd.	" "	
10	10 14 45	276.24	10 14 50	18.15	8, 8	g	400	Hd.	" "	
15	9 21 56	107.28	9 21 43	2.75	8, 8	f	400	Hd.	" "	
16	9 36 33	91.70	9 36 36	21.38	8, 8	g	400	Hd.	" "	
19	7 42 33	95.69	7 42 20	83.10	8, 8	f	400	Hd.	" "	
26	8 6 3	279.12	8 9 40	9.62	4, 8	g	400	Hd.	" "	Clouds interrupt.
30	7 51 39	95.30	7 51 35	94.79	8, 8	g	400	Hd.	" "	
Nov. 16	7 13 1	97.35	7 13 6	28.39	8, 8	g	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS-RHEA.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	"						
July 31	9 49 0	49.48	9 49 0	56.17	10, 10	3–4	400	See	26-inch	
Aug. 2	10 48 0	245.57	10 48 0	20.80	10, 10	3	400	See	" "	
7	10 57 0	265.95	10 57 0	113.66	10, 10	2	400	See	" "	Unsteady.
8	9 4 0	336.60	9 4 0	33.91	10, 10	3	400	See	" "	Unsteady and blurred.
16	8 35 0	233.75	8 35 0	50.78	10, 10	2	400	See	" "	
17	9 38 0	306.22	9 38 30	79.84	10, 10	3	400	See	" "	
18	8 34 0	86.36	8 34 0	48.97	10, 10	3	400	See	" "	
18	10 14 38	88.34	10 14 51	44.92	10, 10	2–3	400	See	" "	
19	9 50 0	93.13	9 50 0	80.06	10, 10	2	400	See	" "	
21	8 16 0	291.26	8 16 0	67.49	10, 10	3	400	See	" "	
22	8 44 0	297.40	8 45 0	42.26	10, 10	2	400	See	" "	
23	9 1 0	84.84	9 1 0	108.33	10, 10	3	400	See	" "	Hazy.
24	8 49 30	179.61	8 50 0	37.09	10, 10	3	400	See	" "	
25	9 22 30	243.71	9 22 45	23.29	10, 10	3	400	See	" "	
27	10 17 30	82.20	10 17 0	89.12	10, 10	3	400	See	" "	
28	8 30 22	110.57	8 30 0	32.62	10, 10	3	400	See	" "	
29	9 47 22	154.07	9 47 0	45.34	10, 10	5	400	See	" "	
30	8 38 0	280.44	8 38 0	117.10	10, 10	2–3	400	See	" "	Hazy and unsteady.
31	8 24 0	46.65	8 24 0	24.31	10, 10	2–3	400	See	" "	
Sept. 4	7 58 18	276.48	7 58 21	55.79	10, 10	2	400	See	" "	Unsteady.
5	7 43 0	35.26	7 43 0	52.93	10, 10	3	400	See	" "	
6	8 1 0	116.82	8 1 0	74.09	10, 10	3	400	See	" "	
7	7 39 0	149.16	7 38 45	16.64	10, 10	3–4	400	See	" "	
11	8 28 22	108.11	8 28 0	87.54	10, 10	2	400	See	" "	Fuzzy and blurred.
1903										
May 8	16 18 43	95.20	16 17 42	43.07	10, 10	f	400	Fk.	26-inch	
10	16 19 18	287.45	16 19 18	84.79	10, 10	p	400	Fk.	" "	
13	16 2 22	154.13	16 2 20	38.71	8, 8	g	400	Fk.	" "	
21	15 15 8	77.13	15 14 35	30.23	8, 8	f	400	Fk.	" "	
June 2	15 36 25	313.53	15 36 21	37.73	8, 8	g	400	Fk.	" "	
3	14 45 33	353.16	14 45 20	13.95	8, 8	p	400	Fk.	" "	
15	15 23 45	285.14	15 23 41	74.80	8, 8	p	400	Fk.	" "	
18	13 50 25	136.79	13 50 23	46.50	8, 8	f	400	Fk.	" "	
20	14 44 32	279.13	14 44 57	105.55	8, 8	g	400	Fk.	" "	
21	12 54 43	65.00	12 54 39	60.07	8, 8	p	400	Fk.	" "	
29	13 10 2	273.68	13 10 0	45.14	8, 8	f	400	Fk.	" "	
30	12 24 6	344.34	12 23 25	39.39	8, 8	g	400	Fk.	" "	
July 2	15 35 18	143.65	15 35 32	14.68	8, 8	b	400	Fk.	" "	
6	14 32 59	101.91	14 32 53	90.10	8, 8	p	400	Fk.	" "	
7	13 27 14	254.04	13 27 12	79.57	8, 8	p	400	Fk.	" "	
9	13 32 30	312.83	13 33 16	34.76	8, 8	e	400	Fk.	" "	
15	11 58 12	107.24	11 57 54	29.57	8, 8	p	400	Fk.	" "	
18	12 7 27	70.64	12 7 9	26.38	8, 8	b	400	Fk.	" "	
21	10 52 26	278.08	10 52 22	71.14	8, 8	f	400	Fk.	" "	
22	11 55 46	282.61	11 55 20	63.67	8, 8	b	400	Fk.	" "	
23	10 59 23	69.58	10 59 15	73.89	8, 8	b	400	Fk.	" "	
24	11 30 53	125.90	11 30 51	51.08	8, 8	f	400	Fk.	" "	
27	10 58 22	55.75	10 58 12	48.26	8, 8	b	600	Fk.	" "	
28	12 26 15	91.75	12 26 11	35.13	8, 8	g	400	Fk.	" "	
30	11 43 56	272.23	11 43 38	114.78	8, 8	f	200	Fk.	" "	
Aug. 5	10 48 3	335.74	10 48 0	47.75	8, 8	b	400	Fk.	" "	
9	10 33 49	312.62	10 34 0	54.69	8, 8	f	400	Fk.	" "	
11	10 11 42	95.85	10 11 30	103.68	8, 8	b	400	Fk.	" "	
17	10 37 20	228.30	10 38 7	29.28	8, 8	g	400	Fk.	" "	Clouds interrupt.
18	10 2 38	289 59	10 3 14	107.35	8, 8	f	400	Fk.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–RHEA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	h m s	"						
Aug. 20	9 55 46	93.43	9 55 42	43.63	8, 8	b	400	Fk.	26-inch	
21	9 33 43	160.54	9 33 50	43.50	8, 8	f	400	Fk.	" "	
22	10 22 18	285.38	10 22 12	98.72	8, 8	b	400	Fk.	" "	
23	10 30 40	334.60	10 30 52	13.10	8, 8	b	400	Fk.	" "	
24	9 52 26	76.74	9 52 14	74.97	8, 8	b	400	Fk.	" "	
Sept. 2	8 28 26	71.67	8 28 18	27.34	8, 8	f	400	Fk.	" "	
3	8 15 3	109.21	8 14 58	99.50	8, 8	g	400	Fk.	" "	
4	8 30 8	267.08	8 30 24	95.09	8, 8	f	400	Fk.	" "	
10	8 20 52	320.92	8 21 11	57.65	8, 9	f	400	Fk.	" "	
11	8 8 8	97.72	8 8 21	69.69	8, 8	f	400	Fk.	" "	
12	7 51 8	100.60	7 51 17	58.37	8, 8	p	400	Fk.	" "	
13	7 47 38	243.33	7 47 43	65.89	8, 8	g	400	Fk.	" "	
14	7 21 5	300.19	7 21 11	61.74	8, 8	g	400	Fk.	" "	
15	7 48 20	162.89	7 48 14	15.06	8, 8	f	400	Fk.	" "	
20	7 36 38	88.39	7 36 51	105.97	8, 8	f	400	Fk.	" "	
21	7 38 34	141.27	7 38 12	21.01	8, 8	p	400	Fk.	" "	
25	8 57 40	85.61	8 57 35	57.51	8, 8	g	400	Fk.	" "	
26	7 31 51	105.35	7 31 49	76.61	8, 8	f	400	Fk.	" "	
29	7 35 53	69.27	7 36 15	68.75	8, 8	g	400	Fk.	" "	
30	7 31 26	128.70	7 31 28	58.73	8, 8	f	400	Fk.	" "	
Oct. 7	6 54 34	1.28	6 54 22	21.95	9, 8	f	400	Fk.	" "	
14	6 31 38	154.08	6 31 43	12.40	8, 8	g	400	Fk.	" "	
1904										
June 12	15 30 56	83.98	15 30 47	68.82	8, 8	p	400	Fk.	26-inch	
14	15 8 35	123.87	15 8 6	49.44	8, 8	b	400	Fk.	" "	
17	14 51 22	71.24	14 51 25	43.94	8, 8	g	400	Fk.	" "	
22	14 6 2	104.53	14 5 45	68.94	8, 8	b	400	Fk.	" "	
23	13 54 35	113.12	13 54 45	32.72	8, 8	f	400	Fk.	" "	
25	15 29 27	14.96	15 29 10	21.39	8, 8	b	400	Fk.	" "	
July 3	13 4 0	254.20	13 4 14	37.83	8, 8	f	400	Fk.	" "	
11	13 27 42	190.53	13 27 14	26.65	8, 8	b	400	Fk.	" "	
13	13 23 4	283.30	13 23 3	86.04	8, 8	b	400	Fk.	" "	
14	13 38 13	86.35	13 37 58	98.89	8, 8	f	400	Fk.	" "	
19	13 12 59	84.33	13 13 29	40.93	8, 8	p	400	Hd.	" "	
20	12 48 43	117.30	12 48 36	70.75	8, 8	f	400	Hd.	" "	
26	11 52 21	270.33	11 52 9	83.74	8, 8	p	400	Hd.	" "	
31	11 57 16	319.33	11 57 18	28.44	8, 8	p	400	Hd.	" "	
Aug. 3	11 51 58	259.53	11 52 14	66.66	8, 8	p	400	Hd.	" "	
12	11 45 24	215.97	11 45 41	36.47	8, 8	g	400	Hd.	" "	
15	11 1 13	86.64	11 1 36	100.64	8, 8	g	400	Hd.	" "	
16	10 43 56	153.40	10 44 13	31.01	8, 8	b	400	Hd.	" "	
21	10 9 47	123.80	10 10 27	46.88	8, 8	g	400	Hd.	" "	
23	10 29 51	57.42	10 29 44	24.36	8, 8	p	400	Hd.	" "	
24	9 47 16	69.00	9 47 13	34.87	8, 8	f	400	Hd.	" "	
28	10 13 49	35.72	10 13 28	35.67	8, 8	p	400	Hd.	" "	
Sept. 2	9 10 55	94.06	9 11 2	45.16	8, 8	g	400	Hd.	" "	
4	10 37 49	263.94	10 37 45	95.78	8, 8	g	400	Hd.	" "	
5	9 56 55	301.98	9 57 21	32.54	8, 8	b	400	Hd.	" "	
7	8 49 37	96.84	8 49 45	125.43	8, 8	p	400	Hd.	" "	
10	9 11 27	295.11	9 11 45	79.42	8, 8	p	400	Hd.	" "	
11	8 55 0	93.38	8 55 13	102.22	8, 8	g	400	Hd.	" "	
16	8 24 10	88.17	8 24 47	76.29	8, 8	f	400	Hd.	" "	
17	8 41 42	174.94	8 41 46	33.75	8, 8	g	400	Hd.	" "	
18	9 4 48	280.32	9 5 6	60.21	8, 8	f	400	Hd.	" "	
21	8 9 12	130.96	8 9 53	37.27	8, 8	b	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–RHEA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	h m s	″						
Sept. 23	8 49 1	278.88	8 49 27	117.26	8, 8	p	400	Hd.	26-inch	
25	8 28 31	94.40	8 28 38	34.90	8, 8	g	400	Hd.	" "	
26	8 8 0	117.55	8 7 59	66.11	8, 8	f	400	Hd.	" "	
Oct. 1	9 6 25	267.94	9 6 19	52.87	8, 8	p	400	Hd.	" "	
3	10 36 8	48.20	10 36 10	42.82	8, 8	g	400	Hd.	" "	
4	7 45 28	103.16	7 45 32	76.92	8, 8	..	400	Hd.	" "	
5	8 1 26	112.53	8 1 48	34.43	8, 8	f	400	Hd.	" "	
6	8 47 36	265.67	8 47 57	95.90	8, 8	f	400	Hd.	" "	
7	7 11 50	319.51	7 12 10	38.37	8, 8	e	400	Hd.	" "	
9	8 19 57	100.51	8 20 3	102.48	8, 8	e	400	Hd.	" "	
10	7 13 34	255.54	7 13 47	68.97	8, 8	p	400	Hd.	" "	
1905										
July 9	14 11 0	278.81	14 11 8	112.92	8, 8	e	400	Hd.	26-inch	
17	13 19 6	195.77	13 19 12	6.23	8, 8	f	400	Hd.	" "	
18	13 7 55	273.60	13 7 50	109.16	8, 8	f	400	Hd.	" "	
25	12 26 6	98.96	12 26 8	119.56	8, 8	b	400	Hd.	" "	
26	12 50 37	266.32	12 50 43	57.70	8, 8	g	400	Hd.	" "	
Aug. 1	14 7 42	296.42	14 7 46	46.63	8, 8	g	400	Hd.	" "	
3	12 59 49	94.99	12 59 49	99.86	8, 8	e	400	Hd.	" "	
5	13 16 51	282.20	13 16 41	45.54	8, 8	g	400	Hd.	" "	
19	12 17 10	276.68	12 17 18	80.80	8, 8	p	400	Hd.	" "	
21	12 0 56	106.56	12 0 59	54.42	8, 8	e	400	Hd.	" "	
23	11 18 9	272.34	11 18 20	118.23	8, 8	e	400	Hd.	" "	
27	10 27 57	268.52	10 28 42	97.21	8, 8	p	400	Hd.	" "	
31	10 43 50	257.07	10 43 43	30.91	8, 8	f	400	Hd.	" "	
Sept. 6	11 9 36	290.49	11 9 55	58.39	8, 8	f	400	Hd.	" "	
7	10 26 0	9.21	10 26 3	7.18	8, 8	f	400	Hd.	" "	
8	10 3 13	92.70	10 3 31	108.57	8, 8	g	400	Hd.	" "	
9	10 40 58	238.78	10 41 8	34.57	8, 8	e	400	Hd.	" "	
14	10 50 47	192.36	10 50 47	14.56	8, 8	p	400	Hd.	" "	
15	10 42 47	280.46	10 42 48	117.19	8, 8	e	400	Hd.	" "	
16	9 50 42	84.00	9 50 58	56.20	8, 8	g	400	Hd.	" "	
18	11 14 49	132.64	11 14 56	37.81	8, 8	e	400	Hd.	" "	
24	8 57 49	273.53	8 58 2	91.92	8, 8	f	400	Hd.	" "	
25	9 35 51	62.89	9 37 5	42.15	8, 8	p	400	Hd.	" "	
26	9 10 6	102.08	9 10 11	51.82	8, 8	e	400	Hd.	" "	
27	9 5 38	105.80	9 5 55	57.06	8, 8	f	400	Hd.	" "	
28	9 21 33	270.69	9 21 4	114.49	8, 8	g	400	Hd.	" "	
30	9 2 44	56.06	9 2 51	14.72	8, 8	f	400	Hd.	" "	
Oct. 1	8 43 21	100.16	8 43 43	113.62	8, 8	f	400	Hd.	" "	
4	8 38 50	305.00	8 38 48	41.12	8, 8	f	400	Hd.	" "	
5	8 20 1	97.23	8 20 3	113.56	8, 8	p	400	Hd.	" "	
7	8 35 30	259.07	8 35 45	52.13	8, 10	e	400	Hd.	" "	
8	8 19 50	292.84	8 19 42	68.30	8, 8	e	400	Hd.	" "	
14	7 50 44	90.60	7 51 12	107.89	8, 8	g	400	Hd.	" "	
16	7 41 11	265.10	7 41 11	25.67	8, 8	f	400	Hd.	" "	
17	7 35 58	280.74	7 36 1	98.97	8, 8	e	400	Hd.	" "	
1906										
July 30	13 47 18	94.45	13 47 11	121.29	8, 8	e	400	Hd.	26-inch	
Aug. 15	12 40 40	274.48	12 41 0	128.98	8, 8	e	400	Hd.	" "	
18	11 50 11	98.76	11 50 14	97.38	8, 8	g	400	Hd.	" "	
22	12 15 58	99.14	12 15 50	97.57	8, 8	f	400	Hd.	" "	
Sept. 1	11 27 1	263.01	11 27 9	38.64	8, 8	f	400	Hd.	" "	
5	11 52 49	101.07	11 52 59	23.51	8, 8	f	400	Hd.	" "	
6	11 43 10	243.59	11 43 10	18.60	8, 8	g	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS-RHEA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1906	h m s	°	h m s	"						
Sept. 12	11 21 37	277.16	11 21 43	56.37	8, 8	e	400	Hd.	26-inch	
18	11 16 52	96.42	11 16 57	37.12	8, 8	g	400	Hd.	" "	
19	9 19 35	100.50	9 19 25	70.87	8, 8	g	400	Hd.	" "	
21	10 12 25	334.15	10 12 32	5.96	8, 8	g	400	Hd.	" "	
23	10 22 44	99.75	10 22 58	103.41	8, 8	p	400	Hd.	" "	
Oct. 7	9 45 25	250.98	9 45 15	18.55	8, 8	f	400	Hd.	" "	
12	9 27 36	184.06	9 27 45	13.16	8, 8	e	400	Hd.	" "	
13	8 47 16	278.59	8 47 7	102.29	4, 4	g	400	Hd.	" "	
14	8 21 51	63.44	8 21 59	6.77	6, 6	e	400	Hd.	" "	
1907										
Aug. 4	13 37 2	96.28	13 40 28	79.22	4, 8	g	400	Hd.	26-inch	Clouds interrupt.
7	13 28 6	274.24	13 28 3	120.71	8, 8	g	400	Hd.	" "	
18	13 25 11	94.00	13 25 3	31.27	8, 8	f	400	Hd.	" "	
20	11 43 11	275.77	11 42 52	89.05	8, 8	e	400	Hd.	" "	
25	12 8 14	274.30	12 8 14	42.02	8, 8	f	400	Hd.	" "	
26	11 56 28	273.07	11 56 16	72.51	8, 8	e	400	Hd.	" "	
Sept. 5	11 31 20	95.03	11 31 11	104.09	8, 8	f	400	Hd.	" "	
6	10 49 41	90.73	10 49 46	26.18	8, 8	f	400	Hd.	" "	
7	11 19 15	93.48	11 19 22	7.66	8, 8	g	400	Hd.	" "	
8	11 39 23	274.42	11 39 39	127.67	8, 8	e	400	Hd.	" "	
12	11 34 33	274.68	11 34 26	111.66	8, 8	f	400	Hd.	" "	
13	10 42 44	270.23	10 42 59	18.66	8, 8	e	400	Hd.	" "	
14	11 4 27	94.51	11 4 34	37.61	8, 8	e	400	Hd.	" "	
20	11 10 4	94.19	11 10 10	52.94	8, 8	g	400	Hd.	" "	
26	10 52 4	272.78	10 52 12	36.33	8, 8	g	400	Hd.	" "	
29	9 57 29	281.63	9 57 26	6.38	8, 8	f	400	Hd.	" "	
30	10 4 55	272.79	10 4 43	38.78	8, 8	p	400	Hd.	" "	
Oct. 1	10 30 31	275.08	10 30 21	78.75	8, 8	e	400	Hd.	" "	
2	9 33 16	94.80	9 33 20	69.72	8, 8	g	400	Hd.	" "	
9	10 35 26	272.97	10 35 34	30.92	8, 8	g	400	Hd.	" "	
10	9 57 50	274.77	9 57 49	101.61	8, 8	f	400	Hd.	" "	
15	9 2 47	95.22	9 2 50	30.22	8, 8	g	400	Hd.	" "	
16	9 46 9	92.29	9 46 17	42.23	8, 8	g	400	Hd.	" "	
19	7 52 7	273.29	7 52 19	40.04	8, 8	f	400	Hd.	" "	
30	8 1 43	94.99	8 1 47	125.80	8, 8	g	400	Hd.	" "	
Nov. 16	7 4 56	93.68	7 5 0	64.39	8, 8	g	400	Hd.	" "	

TETHYS-TITAN

1902										
July 31	9 57 0	33.83	9 57 0	94.41	10, 10	3-4	400	See	26-inch	
Aug. 2	10 55 15	82.14	10 55 0	185.78	10, 10	3	400	See	" "	
7	9 29 45	197.09	9 29 30	84.54	10, 10	1-2	400	See	" "	Very unsteady.
8	9 23 22	192.69	9 23 30	64.45	10, 10	2-3	400	See	" "	
12	9 24 0	281.33	9 24 30	136.20	10, 10	2	400	See	" "	Hazy.
16	8 20 0	64.54	8 20 0	95.98	10, 10	2	400	See	" "	Unsteady and blurred.
17	9 26 0	64.99	9 26 0	130.54	10, 10	3	400	See	" "	
18	8 42 30	92.96	8 41 30	174.81	10, 10	3	400	See	" "	
18	10 33 0	93.31	10 33 0	165.22	10, 10	2-3	400	See	" "	
19	10 4 0	91.27	10 4 0	193.86	10, 10	2	400	See	" "	Hazy and unsteady.
21	8 58 30	108.52	8 58 30	161.09	10, 10	3	400	See	" "	
22	8 59 0	150.46	8 59 0	100.31	10, 10	2	400	See	" "	
23	8 54 15	148.18	8 54 0	77.51	10, 10	3	400	See	" "	Hazy.
24	8 35 52	233.89	8 36 0	118.84	10, 10	3	400	See	" "	
25	8 57 0	242.86	.. .. ..	.....	10, ..	3	400	See	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	"						
Aug. 27	10 12 0	272.83	10 12 0	137.68	10, 10	3	400	See	26-inch	
28	8 54 0	282.57	8 54 0	217.88	10, 10	3	400	See	" "	
29	10 9 15	297.34	10 9 0	103.97	10, 10	5	400	See	" "	
30	8 17 0	306.10	8 17 0	140.87	10, 10	2–3	400	See	" "	Hazy and unsteady.
31	8 18 15	28.97	8 18 0	62.56	10, 10	2–3	400	See	" "	
Sept. 5	8 9 45	99.86	8 10 0	169.61	10, 10	3	400	See	" "	
6	8 16 0	124.68	8 15 30	143.71	10, 10	2	400	See	" "	
7	8 7 52	123.98	8 8 30	106.31	10, 10	3–4	400	See	" "	
11	8 49 52	264.07	8 50 0	121.59	10, 10	2	400	See	" "	Unsteady and fuzzy.
1903										
May 13	16 36 45	306.71	16 36 16	73.40	8, 8	g	400	Fk.	26-inch	Daylight.
20	15 46 24	111.88	15 45 39	163.33	7, 8	b	400	Fk.	" "	
June 2	15 55 31	91.27	15 55 27	210.44	8, 8	f	400	Fk.	" "	
3	14 57 47	102.63	14 57 46	147.17	8, 8	b	400	Fk.	" "	
21	14 43 45	111.60	14 43 35	160.25	8, 8	p	400	Fk.	" "	
29	13 24 14	297.69	13 24 13	89.78	8, 8	f	400	Fk.	" "	
30	14 4 55	325.05	14 4 44	91.48	8, 8	g	400	Fk.	" "	
July 6	14 8 9	103.49	14 8 24	192.41	8, 8	p	400	Fk.	" "	
7	14 6 41	133.51	14 7 9	95.45	8, 8	b	400	Fk.	" "	
9	14 14 56	234.00	14 14 40	92.05	8, 8	b	400	Fk.	" "	Seeing suddenly became bad.
13	13 12 33	279.93	13 12 37	226.40	6, 8	b	400	Fk.	" "	
15	11 35 32	296.18	11 35 35	161.35	8, 8	f	400	Fk.	" "	
18	12 19 34	81.00	12 19 13	126.34	8, 8	b	400	Fk.	" "	
21	11 26 28	95.89	11 26 40	189.48	8, 8	g	400	Fk.	" "	
23	11 35 0	112.58	11 34 47	137.20	8, 8	p	400	Fk.	" "	
24	12 12 13	173.31	12 11 40	73.22	8, 8	g	400	Fk.	" "	
27	11 11 44	259.57	11 11 27	110.89	8, 8	b	600	Fk.	" "	
28	13 24 4	273.52	13 24 20	226.59	8, 8	f	400	Fk.	" "	
30	12 4 29	286.79	12 4 14	204.72	8, 8	f	200	Fk.	" "	
Aug. 9	10 55 48	135.77	10 56 31	76.53	8, 9	p	400	Fk.	" "	
11	10 24 25	244.22	10 24 35	79.90	9, 8	b	400	Fk.	" "	
17	11 2 30	19.22	11 2 30	54.81	8, 8	p	400	Fk.	" "	
18	9 50 16	5.52	9 50 6	65.59	8, 8	f	400	Fk.	" "	
20	10 6 57	78.45	10 7 18	135.39	9, 8	b	400	Fk.	" "	
21	9 53 13	98.05	9 52 50	213.44	8, 8	b	400	Fk.	" "	
22	9 58 47	97.26	9 58 40	164.89	8, 8	f	400	Fk.	" "	
23	10 7 15	114.78	10 7 32	173.16	8, 8	f	400	Fk.	" "	
24	9 43 24	118.07	9 43 20	106.57	8, 8	f	400	Fk.	" "	
Sept. 2	8 48 7	315.26	8 48 11	95.07	8, 8	f	400	Fk.	" "	
3	8 51 58	64.39	8 52 10	105.14	8, 8	g	400	Fk.	" "	
4	9 10 15	58.95	9 10 42	87.86	8, 8	f	400	Fk.	" "	
10	8 9 43	160.54	8 9 36	53.39	8, 8	f	400	Fk.	" "	
11	8 46 42	211.70	8 46 49	85.88	8, 8	g	400	Fk.	" "	
12	8 0 41	255.10	8 0 42	102.37	8, 8	p	400	Fk.	" "	
13	7 59 0	259.29	7 58 57	168.17	8, 8	g	400	Fk.	" "	
14	7 30 37	276.80	7 31 1	159.46	8, 8	g	400	Fk.	" "	
15	7 27 4	276.32	7 28 38	200.04	8, 8	p	400	Fk.	" "	
20	7 26 10	79.60	7 26 24	160.66	8, 8	f	400	Fk.	" "	
21	7 18 31	81.12	7 18 26	118.24	8, 8	p	400	Fk.	" "	
25	8 39 9	127.67	8 39 8	81.51	8, 8	g	400	Fk.	" "	
26	7 7 29	150.49	7 7 2	94.05	8, 8	f	400	Fk.	" "	
29	6 53 53	269.15	6 53 29	149.39	8, 8	g	400	Fk.	" "	
30	6 52 57	268.09	6 53 7	181.01	8, 8	p	400	Fk.	" "	
Oct. 7	6 31 47	88.19	6 31 42	198.53	8, 8	f	400	Fk.	" "	
14	8 2 23	259.25	8 2 38	115.76	8, 8	f	400	Fk.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–HYPERION.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	h m s	″						
Sept. 13	9 21 36	92.76	9 21 33	167.67	8, 8	g	400	Fk.	26-inch	Hyperion identified by motion.
14	8 25 20	92.86	8 25 15	224.45	8, 8	g	400	Fk.	" "	Hyperion identified by motion.
15	8 32 11	107.77	8 31 31	172.22	8, 8	f	400	Fk.	" "	Hyperion identified by motion.
22	8 11 36	240.36	8 10 50	129.00	8, 8	p	400	Fk.	" "	
25	7 47 10	275.20	7 47 20	257.70	8, 8	f	400	Fk.	" "	Hyperion identified by motion.
26	7 50 34	273.28	7 50 28	212.81	8, 8	f	400	Fk.	" "	

TETHYS–JAPETUS.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	s	h m s	″	″						
July 31	11 7 0	94.74	.....	11 7 0	526.99	.....	10, 10	3–4	400	See	26-inch	Hazy; clouds at times.
Aug. 2	11 15 0	96.39	.....	11 15 0	535.62	.....	10, 10	2–3	400	See	" "	
7	10 37 0	104.35	.....	10 37 0	399.82	.....	10, 10	1–2	400	See	" "	
12	9 58 7	110.27	.....	9 57 45	331.93	.....	10, 10	2–3	400	See	" "	
16	8 53 0	129.95	.....	8 53 30	178.27	.....	10, 10	2	400	See	" "	Unsteady and blurred.
17	9 17 30	140.18	.....	9 17 30	97.24	.....	10, 10	3	400	See	" "	
18	8 20 52	159.46	.....	8 20 15	115.09	.....	10, 10	3	400	See	" "	
18	10 46 38	168.61	.....	10 47 0	108.72	.....	10, 10	2–3	400	See	" "	
19	10 9 52	181.98	.....	10 9 45	67.65	.....	10, 10	2–3	400	See	" "	Hazy.
20	9 58 30	217.46	.....	10 1 0	119.10	.....	5, 8	2	400	See	" "	Clouds interrupt.
21	8 21 45	232.96	.....	8 22 0	97.35	.....	10, 10	3	400	See	" "	
22	9 14 30	244.39	.....	9 14 15	182.31	.....	10, 10	2	400	See	" "	
23	8 48 0	250.13	.....	8 48 0	152.59	.....	10, 10	3	400	See	" "	Hazy.
24	8 27 0	256.19	.....	8 27 0	257.46	.....	10, 10	3	400	See	" "	
25	8 48 0	258.03	.....	8 47 15	216.78	.....	10, 10	3	400	See	" "	
28	9 43 0	267.94	.....	9 43 0	397.07	.....	10, 10	3	400	See	" "	
30	9 19 0	270.85	.....	9 19 0	447.11	.....	10, 10	2–3	400	See	" "	
31	8 56 38	267.75	.....	8 57 0	405.17	.....	10, 10	2–3	400	See	" "	
Sept. 5	8 49 30	276.31	.....	8 49 30	517.91	.....	10, 10	4	400	See	" "	
6	8 54 27	273.28	.....	8 54 30	540.89	.....	10, 10	3	400	See	" "	
7	8 41 30	277.86	.....	8 41 30	516.21	.....	10, 10	3–4	400	See	" "	
11	9 11 0	279.59	.....	9 10 30	483.22	.....	10, 10	2–3	400	See	" "	
1903												
July 6	12 46 30	176.39	.....	12 47 30	37.69	.....	8, 8	p	400	Fk.	26-inch	
7	12 52 50	242.02	.....	12 52 35	109.29	.....	8, 8	p	400	Fk.	" "	
8	14 9 48	239.29	.....	14 9 56	80.77	.....	8, 8	p	400	Fk.	" "	
9	12 43 4	258.00	.....	12 42 24	193.74	.....	8, 8	e	400	Fk.	" "	
13	12 45 15	267.45	.....	12 45 50	349.29	.....	8, 8	b	400	Fk.	" "	
15	11 16 3	269.22	.....	11 15 54	412.89	.....	8, 8	p	400	Fk.	" "	Eyepiece moved back and forth.
18	11 29 9	267.26	.....	11 29 19	438.02	.....	8, 8	p	400	Fk.	" "	Eyepiece moved back and forth.
21	12 14 46	272.57	.....	12 14 37	512.86	.....	8, 8	g	400	Fk.	" "	Eyepiece moved back and forth.
23	12 11 51	272.97	.....	12 12 31	523.38	.....	9, 8	p	400	Fk.	" "	Eyepiece moved back and forth.
Aug. 17	10 6 36	75.12	.....	10 6 50	150.10	.....	8, 8	g	400	Fk.	" "	
18	9 39 0	61.50	.....	9 38 42	116.28	.....	8, 8	f	400	Fk.	" "	
20	10 28 28	75.59	.....	10 28 43	205.59	.....	8, 8	f	400	Fk.	" "	
21	10 6 10	87.04	.....	10 7 19	290.74	.....	8, 8	b	400	Fk.	" "	
Sept. 21	7 52 10	183.91	.....	7 51 30	54.47	.....	8, 8	b	400	Fk.	" "	

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SATELLITES OF SATURN—Continued.

TETHYS–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	s	h m s	″	″						
Sept. 22	7 44 40	152.43	.....	7 44 47	80.34	.....	8, 8	p	400	Fk.	26-inch	
24	7 18 21	216.59	.....	7 18 16	84.47	.....	8, 8	b	400	Fk.	" "	
25	7 7 38	256.86	.....	7 7 18	155.52	.....	8, 8	f	400	Fk.	" "	
26	6 58 2	245.97	.....	6 58 1	153.22	.....	8, 8	g	400	Fk.	" "	
1904												
Aug. 24	10 31 58	.....	−40.022	10 31 58	.....	+ 9.22	25, 5	f	400	Hd.	26-inch	
25	11 29 11	.....	−36.363	11 29 11	.....	−11.99	25, 5	p	400	Hd.	" "	
26	10 35 32	.....	−40.413	10 35 32	.....	+15.20	25, 5	b	400	Hd.	" "	
28	11 1 4	.....	−39.417	11 1 4	.....	+20.06	25, 5	b	400	Hd.	" "	
Sept. 2	10 30 48	.....	−37.783	10 30 48	.....	+13.75	25, 5	g	400	Hd.	" "	
4	11 1 55	.....	−35.567	11 1 55	.....	+22.91	25, 5	g	400	Hd.	" "	
5	10 36 38	.....	−27.891	10 36 38	.....	+21.43	25, 5	b	400	Hd.	" "	Thick.
7	9 43 56	.....	−23.694	9 43 56	.....	+21.94	18, 6	p	400	Hd.	" "	Poor observation.
10	10 44 27	.....	−21.701	10 44 27	.....	+41.36	25, 5	f	400	Hd.	" "	
11	10 44 0	.....	−14.560	10 44 0	.....	+17.66	24, 5	e	400	Hd.	" "	
25	9 40 27	.....	+20.659	9 40 27	.....	+23.75	29, 6	g	400	Hd.	" "	
Oct. 7	9 23 10	.....	+38.158	9 23 10	.....	−11.33	25, 5	e	400	Hd.	" "	
9	9 44 54	.....	+37.461	9 44 54	.....	−21.26	25, 5	e	400	Hd.	" "	
10	8 26 35	.....	+30.793	8 26 35	.....	−20.28	24, 5	f	400	Hd.	" "	Bright wires.
11	7 35 23	.....	+35.508	7 35 23	.....	−26.41	24, 5	p	400	Hd	" "	Bright wires.

DIONE–RHEA.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
July 31	9 5 45	76.98	9 6 0	17.54	10, 10	3–4	400	See	26-inch	
Aug. 2	10 38 0	161.60	10 38 0	46.05	10, 10	3	400	See	" "	
7	9 20 37	263.05	9 21 0	19.56	10, 10	1–2	400	See	" "	
8	9 12 30	276.62	9 12 30	63.60	10, 10	2–3	400	See	" "	Unsteady and blurred.
12	9 32 45	293.14	9 33 0	89.73	10, 10	2	400	See	" "	Hazy; clouds interrupt.
16	8 27 30	228.76	8 27 30	53.91	10, 10	2	400	See	" "	Unsteady and blurred.
17	9 48 0	292.31	9 48 30	114.04	10, 10	3	400	See	" "	
18	8 27 22	72.76	8 27 0	94.90	10, 10	3	400	See	" "	
18	10 20 52	78.09	10 21 0	104.03	10, 10	2–3	400	See	" "	
19	9 57 0	128.54	9 57 0	65.42	10, 10	2	400	See	" "	
21	8 10 0	273.46	8 10 0	22.47	10, 10	3	400	See	" "	
22	8 52 0	291.45	8 52 0	57.33	10, 10	2	400	See	" "	
23	9 8 22	73.00	9 8 15	80.10	10, 10	3	400	See	" "	Hazy.
24	8 42 30	122.17	8 42 30	94.81	10, 10	3	400	See	" "	
25	9 15 15	266.48	9 15 30	118.41	10, 10	3	400	See	" "	
27	10 22 8	93.38	10 22 15	50.80	10, 10	2–3	400	See	" "	
28	8 36 38	96.65	8 37 0	23.60	10, 10	3	400	See	" "	
29	9 58 15	128.62	9 58 0	44.97	10, 10	5	400	See	" "	
30	8 31 8	263.42	8 31 0	97.15	10, 10	2–3	400	See	" "	
31	8 31 52	321.88	8 32 0	68.68	10, 10	2–3	400	See	" "	
Sept. 4	7 50 52	282.23	7 50 0	23.84	10, 10	2	400	See	" "	Unsteady.
5	7 35 30	320.34	7 35 0	36.68	10, 10	3	400	See	" "	
6	7 54 38	90.91	7 54 45	107.58	10, 10	3	400	See	" "	
7	7 53 0	174.77	7 53 0	53.24	10, 10	3–4	400	See	" "	
11	8 34 30	107.37	8 34 45	23.77	10, 10	2	400	See	" "	

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SATELLITES OF SATURN—Continued.

DIONE–RHEA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	h m s	″						
May 28	15 28 43	270.31	15 29 8	115.31	8, 8	f	400	Fk.	26-inch	
June 15	15 42 10	282.58	15 42 24	24.63	8, 8	p	400	Fk.	" "	
21	14 21 14	87.49	14 21 21	64.71	8, 8	p	400	Fk.	" "	
30	13 23 14	301.76	13 24 0	32.93	8, 8	p	400	Fk.	" "	
July 6	13 11 48	121.77	13 11 41	14.44	9, 8	p	400	Fk.	" "	
9	15 29 41	22.82	15 29 20	43.63	8, 8	b	400	Fk.	" "	
15	12 18 4	97.34	12 17 48	104.98	8, 8	b	400	Fk.	" "	
20	11 6 47	170.60	11 6 44	7.58	8, 8	b	400	Fk.	" "	
21	11 13 12	224.50	11 13 12	22.92	8, 8	p	400	Fk.	" "	
22	12 10 5	283.81	12 10 24	101.87	8, 8	b	400	Fk.	" "	
23	10 45 12	61.54	10 45 18	67.62	8, 8	b	400	Fk.	" "	
24	11 40 54	112.03	11 40 40	109.08	8, 8	b	400	Fk.	" "	
27	11 59 27	18.71	11 58 34	7.21	8, 8	b	600	Fk.	" "	
28	13 13 2	75.18	13 13 44	44.60	8, 8	f	400	Fk.	" "	
30	13 38 28	264.83	13 38 11	116.24	8, 8	p	200	Fk.	" "	
Aug. 9	11 8 55	7.20	11 8 44	19.92	9, 8	b	400	Fk.	" "	
17	11 32 27	255.21	11 32 21	16.52	8, 8	g	400	Fk.	" "	
20	10 51 24	101.38	10 51 46	133.60	8, 8	p	400	Fk.	" "	
21	10 32 0	238.75	10 32 10	65.77	8, 8	b	400	Fk.	" "	
22	11 10 21	290.51	11 9 34	87.01	8, 8	b	400	Fk.	" "	
23	10 57 44	72.90	10 57 25	35.95	8, 8	p	400	Fk	" "	
Sept. 2	8 37 14	68.14	8 37 22	67.15	8, 8	f	400	Fk.	" "	
3	8 29 19	113.82	8 29 33	105.12	8, 8	g	400	Fk.	" "	
4	8 59 28	263.97	9 0 3	109.89	8, 8	f	400	Fk	" "	
10	8 45 36	309.73	8 45 11	74.91	8, 8	f	400	Fk	" "	
11	8 30 9	91.03	8 29 37	123.49	8, 8	g	400	Fk	" "	
12	8 35 20	165.18	8 35 5	35.41	8, 8	f	400	Fk.	" "	
20	8 12 28	100.33	8 12 15	47.76	8, 8	f	400	Fk	" "	
1904										
June 12	15 50 21	314.74	15 50 28	34.29	8, 8	p	400	Fk.	26-inch	
14	15 32 20	198.44	15 32 16	31.25	8, 8	p	400	Fk.	" "	
17	15 15 25	94.81	15 15 13	26.60	8, 8	f	400	Fk.	" "	
20	14 22 31	277.90	14 22 8	126.84	8, 8	b	400	Fk.	" "	
22	14 31 32	103.77	14 31 44	101.76	8, 8	p	400	Fk.	" "	
23	14 22 14	258.26	14 22 10	44.26	8, 8	f	400	Fk.	" "	
Aug. 23	10 16 53	348.34	10 17 17	37.26	8, 8	p	400	Hd.	" "	
Sept. 2	9 30 8	79.18	9 30 22	16.86	8, 8	g	400	Hd.	" "	
7	9 3 11	108.90	9 3 27	82.46	8, 8	p	400	Hd.	" "	
10	9 22 39	282.63	9 22 33	68.37	8, 8	p	400	Hd.	" "	
11	9 22 41	69.33	9 22 51	60.76	8, 8	g	400	Hd.	" "	
16	8 45 38	89.28	8 45 24	24.28	8, 9	f	400	Hd.	" "	
17	8 53 12	108.90	8 53 13	59.59	8, 8	g	400	Hd.	" "	
18	9 41 38	263.02	9 42 0	90.22	8, 8	f	400	Hd.	" "	
21	8 21 58	140.55	8 22 0	37.40	8, 8	b	400	Hd.	" "	
23	8 59 22	273.43	8 59 29	27.62	8, 8	f	400	Hd.	" "	
25	9 2 28	89.20	9 2 46	106.91	8, 8	g	400	Hd.	" "	
26	8 19 22	137.91	8 19 33	53.92	8, 8	f	400	Hd.	" "	
Oct. 1	9 30 10	149.72	9 30 21	27.25	8, 8	p	400	Hd.	" "	
3	10 48 1	44.56	10 48 22	46.12	8, 8	g	400	Hd.	" "	
4	7 23 28	99.26	7 23 29	124.52	8, 8	..	400	Hd.	" "	
6	8 11 30	281.85	8 11 46	41.96	8, 8	p	400	Hd.	" "	
7	8 28 48	281.67	8 28 59	29.29	8, 8	e	400	Hd.	" "	
9	8 29 30	99.77	8 29 55	115.26	8, 8	e	400	Hd.	" "	
1905										
July 9	14 0 16	282.65	14 0 46	89.96	8, 8	e	400	Hd.	26-inch	

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SATELLITES OF SATURN—Continued.

DIONE–RHEA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1905	h m s	°	h m s	″						
July 17	12 24 54	270.43	12 25 10	61.72	8, 8	f	400	Hd.	26-inch	
18	12 43 37	278.79	12 43 41	22.73	8, 8	f	400	Hd.	" "	
25	13 7 27	100.27	13 7 28	19.93	8, 8	f	400	Hd.	" "	
26	13 14 2	110.57	13 14 9	33.03	8, 8	g	400	Hd.	" "	
Aug. 1	12 37 15	284.27	12 37 32	16.20	8, 8	g	400	Hd.	" "	
3	13 11 1	94.38	13 11 28	110.10	8, 8	e	400	Hd.	" "	
5	13 39 55	278.51	13 40 2	133.44	8, 8	g	400	Hd.	" "	
18	12 0 54	262.26	12 1 9	83.03	8, 8	f	400	Hd.	" "	
19	12 1 8	286.52	12 1 10	96.15	8, 8	p	400	Hd.	" "	
21	12 9 36	112.05	12 9 49	31.14	8, 8	e	400	Hd.	" "	
23	11 6 43	261.74	11 6 43	41.26	8, 8	e	400	Hd.	" "	
27	10 37 20	272.50	10 37 37	102.58	8, 8	f	400	Hd.	" "	
31	10 54 48	113.01	10 55 15	62.60	8, 8	f	400	Hd.	" "	
Sept. 7	10 37 4	315.89	10 37 36	33.53	8, 8	f	400	Hd.	" "	
8	10 14 20	95.46	10 14 19	139.67	8, 8	e	400	Hd.	" "	
9	10 51 9	230.22	10 50 51	34.03	8, 8	e	400	Hd.	" "	
15	10 53 54	279.82	10 54 10	132.86	8, 8	e	400	Hd.	" "	
16	10 0 16	75.05	10 0 22	62.95	7, 8	g	400	Hd.	" "	
18	11 32 38	263.91	11 32 34	32.30	8, 8	e	400	Hd.	" "	
21	9 50 6	71.24	9 50 17	50.64	8, 8	f	400	Hd.	" "	
22	9 38 10	103.30	9 38 21	118.33	8, 8	p	400	Hd.	" "	
24	8 48 0	288.88	8 47 50	66.53	8, 8	p	400	Hd.	" "	
25	9 10 13	87.44	9 10 27	40.07	8, 8	p	400	Hd.	" "	
26	9 20 1	87.86	9 19 51	24.06	8, 8	e	400	Hd.	" "	
27	9 20 28	103.40	9 19 55	66.44	7, 8	p	400	Hd.	" "	
30	8 49 34	89.70	8 49 15	113.78	7, 8	p	400	Hd.	" "	
Oct. 1	8 54 23	123.30	8 54 23	38.29	8, 8	f	400	Hd.	" "	
4	8 22 45	288.74	8 22 55	53.69	8, 8	f	400	Hd.	" "	
5	8 31 36	88.40	8 30 15	99.59	8, 8	p	400	Hd.	" "	
7	8 46 57	274.01	8 47 2	125.71	8, 8	e	400	Hd.	" "	
8	8 30 4	350.64	8 29 55	19.25	8, 8	e	400	Hd.	" "	
9	8 16 26	94.80	8 16 19	46.03	8, 8	g	400	Hd.	" "	
14	7 40 16	96.89	7 40 19	126.82	8, 8	g	400	Hd.	" "	
16	7 52 6	277.97	7 51 57	43.00	8, 8	f	400	Hd.	" "	
17	7 20 46	277.29	7 20 53	30.44	8, 8	e	400	Hd.	" "	
1906										
July 30	13 30 44	90.04	13 30 42	65.68	8, 7	e	400	Hd.	26-inch	
Aug. 15	12 51 1	275.52	12 51 8	138.33	8, 8	e	400	Hd.	" "	
18	12 6 15	98.97	12 6 17	16.58	8, 8	g	400	Hd.	" "	
22	12 39 18	97.12	12 39 22	127.78	8, 8	f	400	Hd.	" "	
Sept. 5	11 40 2	103.18	11 39 59	73.79	8, 8	f	400	Hd.	" "	
6	12 9 22	273.42	12 9 13	99.16	8, 9	g	400	Hd.	" "	
12	12 2 21	300.46	12 2 20	28.50	8, 8	e	400	Hd.	" "	
19	10 6 10	189.38	10 10 36	13.08	4, 8	g	400	Hd.	" "	
19	10 15 21	196.53	.. .. ..	.....	4, .	g	400	Hd.	" "	
Oct. 7	9 35 22	98.72	9 35 32	72.85	8, 8	f	400	Hd.	" "	
12	9 11 13	271.98	9 11 21	40.25	8, 8	e	400	Hd.	" "	
13	8 58 8	271.28	8 58 20	27.32	8, 8	g	400	Hd.	" "	
14	8 32 50	281.34	8 32 56	61.16	6, 6	e	400	Hd.	" "	
1907										
July 26	14 48 57	238.63	14 48 41	6.15	8, 8	f	400	Hd.	26-inch	
Aug. 4	13 52 29	96.93	13 52 38	77.20	8, 8	g	400	Hd.	" "	
7	13 46 52	273.09	13 47 5	23.54	8, 8	g	400	Hd.	" "	
11	12 26 16	275.72	12 26 20	102.23	8, 8	g	400	Hd.	" "	
12	14 13 27	270.09	14 13 4	47.22	8, 8	g	400	Hd.	" "	
18	13 50 53	94.50	13 50 52	132.80	8, 8	f	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

DIONE–RHEA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	h m s	″						
Aug. 20	11 13 45	274.22	11 13 44	65.70	8, 8	g	400	Hd.	26-inch	
26	12 21 4	106.96	12 21 4	11.80	8, 8	e	400	Hd.	" "	
29	11 13 17	91.66	11 13 31	18.82	8, 8	g	400	Hd.	" "	
30	12 9 18	274.40	12 9 34	116.11	8, 8	f	400	Hd.	" "	
Sept. 8	11 52 52	273.70	11 52 38	117.23	8, 8	e	400	Hd.	" "	
13	11 3 1	274.06	11 3 7	107.28	8, 8	e	400	Hd.	" "	
14	11 13 22	95.03	11 13 16	88.94	8, 8	e	400	Hd.	" "	
15	10 6 36	93.66	10 6 47	99.61	8, 8	f	400	Hd.	" "	
16	10 13 25	274.63	10 13 35	89.36	8, 8	g	400	Hd.	" "	
20	11 21 33	94.12	11 21 33	83.35	8, 8	g	400	Hd.	" "	
29	11 58 57	277.57	12 1 36	3.62	4, 8	f	400	Hd.	" "	Dione very near Tethys.
Oct. 1	10 50 52	95.81	10 50 53	4.76	8, 8	e	400	Hd.	" "	
2	9 43 52	88.22	9 43 55	4.38	8, 8	g	400	Hd.	" "	
9	10 44 1	271.43	10 43 56	12.67	8, 8	g	400	Hd.	" "	
10	10 6 19	274.51	10 6 33	83.04	8, 8	f	400	Hd.	" "	
15	9 10 46	93.93	9 10 45	28.31	8, 8	g	400	Hd.	" "	
16	9 55 40	92.74	9 55 50	20.37	8, 8	g	400	Hd.	" "	
30	8 10 40	93.65	8 10 41	31.67	8, 8	g	400	Hd.	" "	
Nov. 16	7 24 6	91.22	7 24 7	38.73	8, 8	g	400	Hd.	" "	

RHEA–TITAN.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	s	h m s	″	″						
May 3	10 10 30	242.89	.....	10 24 48	123.15	.....	4, 8	..	400	Br.	26-inch	
7	10 30 30	266.31	.....	10 47 0	176.41	.....	4, 8	..	400	Br.	" "	
8	11 6 30	273.26	.....	11 21 12	231.08	.....	4, 8	..	400	Br.	" "	
12	12 1 12	78.14	.....	12 0 48	76.11	.....	7, 6	..	400	Br.	" "	
13	10 34 12	74.27	.....	11 4 48	92.28	.....	5, 9	..	400	Br.	" "	Rhea faint.
14	10 1 24	82.76	.....	.. .. ..	.....	.....	5, .	..	400	Br.	" "	Clouds interrupt.
15	10 17 12	.....	+17.102	10 17 0	.....	− 4.07	28, 6	4	400	Br.	" "	Bright moonlight.
27	9 12 48	90.87	.....	9 14 0	47.19	.....	8, 7	3	400	Br.	" "	
28	10 13 48	.....	+11.719	10 14 0	.....	+44.39	44, 6	2	400	Br.	" "	
29	8 56 0	.....	+15.495	8 56 56	.....	+15.30	42, 7	3	400	Br.	" "	
June 2	9 24 16	.....	+ 9.841	9 24 16	.....	−25.60	40, 6	3	400	Br.	" "	
8	10 3 48	267.31	.....	10 4 0	205.23	.....	8, 5	3	400	Br.	" "	
9	9 10 30	.....	−14.766	9 10 0	.....	+18.09	40, 5	2	400	Br.	" "	Hazy and thick.
11	9 24 0	56.44	.....	9 23 30	73.60	.....	10, 6	3	400	Br.	" "	
16	8 46 56	.....	+15.751	8 46 0	.....	−11.73	42, 5	3	400	Br.	" "	
19	10 19 12	213.37	.....	10 20 0	23.13	.....	8, 4	2	400	Br.	" "	
21	8 27 48	245.96	.....	8 28 0	102.04	.....	8, 4	3	400	Br.	" "	
22	9 14 5	.....	−15.596	9 15 12	.....	−31.01	38, 6	3	400	Br.	" "	
23	9 1 30	.....	−16.168	9 2 3	.....	+ 1.85	40, 6	3	400	Br.	" "	
28	9 38 30	45.01	.....	9 49 0	70.28	.....	4, 4	3	400	Br.	" "	
29	9 2 26	.....	+12.631	8 58 0	.....	+36.38	40, 5	4	400	Br.	" "	
1900												
May 5	16 4 48	298.28	.....	16 5 30	194.88	.....	10, 10	3	600	See	26-inch	
9	16 6 24	53.17	.....	16 7 12	75.73	.....	10, 10	1–2	400	See	" "	
12	14 39 12	113.08	.....	14 39 18	217.57	.....	10, 10	4	400	See	" "	
13	12 56 12	143.69	.....	12 58 0	113.59	.....	10, 10	1	400	See	" "	Extremely blurred.
14	13 8 6	186.30	.....	13 8 0	56.61	.....	10, 10	1	400	See	" "	Hazy and blurred.
15	13 46 48	157.32	.....	13 47 30	57.27	.....	10, 10	1	400	See	" "	Hazy.
17	14 9 42	241.43	.....	14 15 30	162.23	.....	5, 5	4	400	See	" "	Clouds interrupt.
20	12 58 48	298.91	.....	12 59 30	113.02	.....	10, 10	2–3	400	See	" "	

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SATELLITES OF SATURN—Continued.

RHEA-TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1900	h m s	°	h m s	"						
May 21	13 58 30	294.32	13 58 30	85.03	10, 10	2–3	400	See	26-inch	
22	12 26 12	296.00	12 27 0	127.64	10, 10	3	400	See	" "	
30	11 58 12	135.16	11 57 12	160.52	10, 10	2–3	400	See	" "	
June 4	11 58 0	264.28	11 57 30	177.37	10, 10	3–4	400	See	" "	
5	12 9 0	280.51	12 9 0	248.13	10, 10	3–4	400	See	" "	
6	12 28 0	303.79	12 28 12	187.65	10, 10	4	400	See	" "	
7	13 4 24	6.32	13 5 0	92.95	10, 10	4–5	400	See	" "	
8	12 22 48	56.76	12 22 48	86.46	10, 10	1	400	See	" "	Hazy and blurred.
11	11 43 12	79.08	11 43 30	196.38	10, 10	2	400	See	" "	Fuzzy.
19	11 42 12	271.77	11 42 42	252.65	10, 10	2	400	See	" "	
20	11 9 36	287.23	11 8 12	183.35	10, 10	2	400	See	" "	
25	11 33 0	300.29	11 33 0	148.42	10, 10	4	400	See	" "	
30	10 4 48	112.61	10 5 0	206.90	10, 10	2–1	400	See	" "	Hazy and blurred.
July 1	10 54 18	151.14	10 54 0	139.33	10, 10	3–4	400	See	" "	
2	9 57 48	224.90	9 58 12	130.60	10, 10	3–4	400	See	" "	
7	10 20 54	285.11	10 21 0	249.84	10, 10	3	400	See	" "	
9	9 35 48	18.07	9 36 0	89.67	10, 10	2–3	400	See	" "	Clouds.
10	9 25 24	51.69	9 25 48	66.90	10, 10	4	400	See	" "	
11	9 22 6	29.54	9 22 12	53.87	10, 10	3–4	400	See	" "	
13	11 7 30	85.10	11 7 0	233.15	10, 10	3–1	400	See	" "	
14	10 13 24	102.64	10 13 48	255.50	10, 10	4–5	400	See	" "	
15	10 4 48	125.26	10 5 12	157.49	10, 10	4	400	See	" "	
16	10 19 30	158.88	10 19 42	70.55	10, 10	2–3	400	See	" "	
17	9 43 0	144.16	9 43 0	61.38	10, 10	4	400	See	" "	
27	9 59 12	71.12	9 59 30	184.15	10, 10	4–5	400	See	" "	
28	9 14 12	91.00	9 15 12	185.64	10, 10	2–3	400	See	" "	
30	9 19 54	92.18	9 20 12	119.04	10, 10	2	400	See	" "	Fuzzy.
31	8 52 30	99.90	8 52 30	191.67	10, 10	2	400	See	" "	
Aug. 2	9 4 24	169.54	9 4 30	119.76	10, 10	4	400	See	" "	
3	9 12 42	237.35	9 13 0	132.84	10, 10	2	400	See	" "	
4	8 44 24	256.53	8 44 42	115.32	10, 10	2–3	400	See	" "	
5	8 47 0	247.68	8 47 30	80.93	10, 10	2	400	See	" "	Unsteady.
8	8 26 48	289.76	8 27 0	230.79	10, 10	3–4	400	See	" "	
9	8 12 36	323.46	8 12 42	124.46	10, 10	2–3	400	See	" "	
10	8 13 12	27.46	8 13 12	71.43	10, 10	2	400	See	" "	Blurred.
11	8 29 0	30.54	8 29 0	46.43	10, 10	2	400	See	" "	
15	8 18 48	106.83	8 19 12	227.13	10, 10	2	400	See	" "	
17	8 38 36	149.21	8 39 0	60.27	10, 10	3–4	400	See	" "	
18	8 21 0	131.13	8 21 12	82.20	10, 10	2	400	See	" "	
19	8 18 36	157.48	8 18 12	99.05	10, 10	3	400	See	" "	
25	8 24 0	288.51	8 23 42	157.89	10, 10	4	400	See	" "	
28	8 20 36	76.87	8 21 0	178.08	10, 10	3–4	400	See	" "	
29	8 15 6	92.90	8 15 42	147.41	7, 10	2–3	400	See	" "	Hazy and thick.
30	8 49 48	92.10	8 50 0	97.16	10, 10	4	400	See	" "	
31	8 7 36	90.29	8 7 42	140.22	10, 10	2–3	600	See	" "	
Sept. 1	7 29 48	102.84	7 29 30	206.95	10, 10	3–4	400	See	" "	
2	8 0 30	126.90	8 0 30	174.77	10, 10	3–4	400	See	" "	
3	7 14 48	186.96	7 13 30	105.32	10, 10	2	400	See	" "	Clouds: satellites very difficult.
4	7 4 0	241.86	7 4 0	117.68	10, 10	4	400	See	" "	
5	7 7 0	250.62	7 7 0	83.57	10, 10	3	400	See	" "	
6	7 15 48	238.15	7 16 30	81.55	10, 10	2	400	See	" "	
1901										
Apr. 16	16 20 48	192.13	16 21 0	96.07	10, 10	3	400	See	26-inch	
26	14 52 12	90.53	14 52 30	100.61	10, 10	2	400	See	" "	
27	14 58 48	85.13	14 59 0	115.30	10, 10	3	400	See	" "	
28	15 4 48	95.19	15 4 30	200.33	10, 10	4	400	See	" "	
29	14 26 12	110.66	14 27 0	218.50	10, 10	3–4	400	See	" "	
May 3	14 32 0	225.72	14 32 30	58.49	10, 10	3	400	See	" "	Hazy.

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SATELLITES OF SATURN—Continued.

RHEA–TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	″						
May 4	15 6 0	245.75	15 6 0	122.30	10, 10	4	400	See	26-inch	
5	15 12 0	268.03	15 12 36	229.31	10, 10	1–2	400	See	" "	Windy and blurred.
6	15 4 12	284.52	15 4 24	237.64	10, 10	3	400	See	" "	Very hazy: satellites very faint.
11	15 47 12	55.70	15 46 54	126.20	10, 10	1–2	400	See	" "	Very unsteady.
13	14 2 54	101.27	14 3 30	231.87	10, 10	3	400	See	" "	
14	14 29 42	117.89	14 30 6	132.19	10, 10	4	400	See	" "	
15	14 11 36	122.04	14 12 0	78.23	10, 10	4	400	See	" "	
22	14 9 18	273.92	14 9 48	119.75	10, 10	2	400	See	" "	
23	13 54 36	281.98	13 55 12	187.23	10, 10	4	400	See	" "	
28	13 43 48	82.95	13 44 12	91.52	10, 10	3	400	See	" "	
June 3	12 22 36	230.61	12 22 36	58.26	10, 10	3	400	See	" "	Hazy.
4	13 4 0	216.55	13 4 12	69.37	10, 10	3–4	400	See	" "	
9	12 36 42	341.52	12 36 48	50.54	10, 10	1	400	See	" "	
10	12 36 24	318.48	12 36 48	66.31	10, 10	3–4	400	See	" "	
18	12 6 24	146.16	12 6 42	126.52	10, 10	3–4	400	See	" "	
19	12 25 36	226.93	12 25 30	137.38	10, 10	3	400	See	" "	
21	12 23 30	275.17	12 24 0	161.30	10, 10	2	400	See	" "	Thin clouds.
23	12 4 12	272.71	12 8 6	150.97	5, 10	2	400	See	" "	Clouds interrupt.
24	11 59 0	285.19	11 59 0	213.50	10, 10	3–4	400	See	" "	
27	10 52 48	74.16	10 52 42	145.66	10, 10	2–3	400	See	" "	Fuzzy.
28	10 52 48	84.39	10 53 6	106.97	10, 10	2–3	400	See	" "	
30	10 33 12	85.92	10 33 30	181.61	10, 10	2–3	400	See	" "	
July 1	10 33 48	101.26	10 34 6	253.18	10, 10	..	400	See	" "	
3	10 21 24	176.71	10 21 30	93.30	10, 10	3	400	See	" "	
5	10 58 54	205.01	10 59 18	50.98	10, 10	2	400	See	" "	Hazy and unsteady.
9	10 52 18	293.52	10 52 18	193.68	10, 10	2–3	400	See	" "	
10	9 58 6	319.73	9 58 18	88.47	10, 10	1–2	400	See	" "	
15	10 15 42	92.92	10 15 48	248.27	10, 10	4	400	See	" "	
20	9 54 42	162.96	9 55 6	118.75	10, 10	2–3	400	See	" "	Unsteady and blurred.
21	10 0 12	238.58	10 0 30	158.27	10, 10	3	400	See	" "	
23	9 20 0	274.42	9 20 12	134.06	10, 10	2	400	See	" "	
28	8 31 42	41.90	8 31 54	112.66	10, 10	2	400	See	" "	Hazy and moonlight, satellites difficult.
29	9 23 18	77.02	9 23 30	126.55	10, 10	2–3	400	See	" "	
30	9 45 36	76.87	9 45 36	83.07	10, 10	1–2	400	See	" "	
31	8 35 0	73.35	8 35 0	111.91	10, 10	3	400	See	" "	
Aug. 1	10 53 0	90.65	10 53 18	222.01	10, 10	4	400	See	" "	
2	9 43 0	106.44	9 43 0	249.07	10, 10	4	400	See	" "	
7	9 35 0	230.27	9 35 0	115.68	10, 10	5	400	See	" "	
8	9 44 12	262.16	9 44 18	228.73	10, 10	4	400	See	" "	
9	9 23 30	279.88	9 23 24	250.82	10, 10	3	400	See	" "	
13	8 4 48	318.52	8 8 48	100.17	5, 10	2–3	400	See	" "	Hazy; clouds interrupt.
16	8 5 30	96.40	8 5 54	225.98	10, 10	3–4	400	See	" "	
19	9 1 48	107.54	9 2 12	145.76	10, 10	2	400	See	" "	Clouds interrupt.
20	8 50 30	125.73	8 50 48	159.80	10, 10	4	400	See	" "	
21	8 29 36	185.21	8 29 36	112.19	10, 10	4	400	See	" "	
22	9 34 12	249.00	9 34 12	170.33	10, 10	3–4	400	See	" "	
26	7 57 54	276.39	7 58 12	204.86	10, 10	3–4	400	See	" "	
27	7 45 42	294.44	7 45 42	207.44	10, 10	3	400	See	" "	Very hazy; clouds interrupt.
28	7 58 12	340.18	7 58 0	112.70	10, 10	2	400	See	" "	Unsteady
29	8 29 0	56.22	8 29 18	111.72	10, 10	5	400	See	" "	
30	8 5 30	75.77	8 5 30	95.50	10, 10	3–4	400	See	" "	
Sept. 3	8 15 24	111.41	8 15 18	224.10	10, 10	3	400	See	" "	
4	8 11 6	144.55	8 11 6	117.41	10, 10	3	400	See	" "	
5	7 52 30	199.19	7 52 30	64.57	10, 10	3	400	See	" "	
6	8 22 36	182.84	8 23 0	45.57	10, 10	4–5	400	See	" "	

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SATELLITES OF SATURN—Continued

RHEA-TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
Sept. 7	7 47 18	184.45	7 47 30	69.28	10, 10	3	400	See	26-inch	Blurred.
9	7 17 0	266.02	7 17 0	235.84	10, 10	3-4	400	See	" "	
11	7 3 54	301.43	7 4 0	119.92	10, 10	2-3	400	See	" "	Cloudy.
12	7 52 54	306.81	7 53 12	66.51	10, 10	2-3	400	See	" "	Unsteady.
20	7 4 12	108.45	7 4 30	164.99	10, 10	2-3	400	See	" "	
1902										
Apr. 30	15 30 45	101.19	15 31 0	245.11	10, 10	2-3	400	See	26-inch	
May 1	16 20 0	120.76	16 20 0	154.78	10, 10	2	400	See	" "	
4	15 31 0	148.44	15 31 0	64.49	10, 10	2-3	400	See	" "	
5	15 0 0	211.86	14 59 45	83.58	10, 10	2	400	See	" "	
6	15 4 15	258.49	15 3 30	192.54	10, 10	2	400	See	" "	
9	15 1 54	297.21	15 1 30	78.79	10, 10	2-3	400	See	" "	
15	14 40 30	102.12	14 40 30	133.45	10, 10	2-3	400	See	" "	
21	14 24 30	262.71	14 24 30	132.35	10, 10	3-4	400	See	" "	
25	14 30 15	287.53	14 30 30	227.35	10, 10	1-2	400	See	" "	Very unsteady and blurred.
28	13 49 30	63.86	13 50 0	63.69	10, 10	2-3	400	See	" "	
29	13 47 0	43.60	13 47 0	51.55	10, 10	2	400	See	" "	Blurred.
30	14 7 0	69.59	14 8 0	125.53	10, 10	2	400	See	" "	Hazy and unsteady.
June 1	14 3 22	104.62	14 3 0	243.66	10, 10	5	400	See	" "	
4	13 57 0	136.62	13 57 0	59.91	10, 10	1-2	400	See	" "	
5	13 37 30	150.15	13 37 30	80.43	10, 10	2-3	400	See	" "	
6	13 17 30	226.92	13 17 30	111.71	10, 10	2-3	400	See	" "	Very hazy.
7	13 50 45	263.40	13 51 0	224.99	10, 10	1-2	400	See	" "	Very blurred.
8	13 41 30	278.71	13 42 0	223.26	10, 10	2-3	400	See	" "	Very bad.
9	13 10 56	290.33	13 11 0	129.81	10, 10	2	400	See	" "	
10	13 30 15	289.28	13 30 30	87.68	10, 10	3	400	See	" "	
11	13 29 0	288.68	13 29 0	133.83	10, 10	2-3	400	See	" "	
21	11 48 30	246.16	11 48 30	130.05	10, 10	2-3	400	See	" "	
23	11 56 0	252.50	11 56 0	80.58	10, 10	3	400	See	" "	
24	11 49 22	260.28	11 49 30	150.18	10, 10	2-3	400	See	" "	
July 11	10 39 40	289.63	10 39 45	111.01	10, 10	2-3	400	See	" "	
12	10 28 30	283.89	10 29 0	106.78	10, 10	2-3	400	See	" "	Unsteady.
13	10 41 30	290.18	10 42 0	159.70	10, 10	3	400	See	" "	
14	10 28 0	318.92	10 28 0	126.75	10, 10	3	400	See	" "	
15	10 38 0	48.25	10 38 0	124.21	10, 10	2-1	400	See	" "	Very unsteady.
16	11 0 0	83.81	11 0 0	199.76	10, 10	3	400	See	" "	
22	10 2 0	201.26	10 2 0	98.02	10, 10	2-3	400	See	" "	Blurred.
31	9 24 0	11.81	9 24 0	42.45	10, 10	3-4	400	See	" "	
Aug. 2	9 22 0	78.98	9 23 0	197.68	10, 10	2-3	400	See	" "	Clouds interrupt.
3	9 26 30	96.62	9 27 0	267.15	10, 10	2	400	See	" "	Very unsteady and blurred.
7	9 13 0	128.88	9 12 30	104.44	10, 10	1-2	400	See	" "	Blurred.
8	8 55 52	179.15	8 56 0	93.58	10, 10	3	400	See	" "	Unsteady and blurred.
12	9 14 0	285.12	9 14 0	98.65	10, 10	2	400	See	" "	Hazy.
16	8 4 0	59.58	8 4 0	143.07	10, 10	2	400	See	" "	Unsteady and blurred.
17	9 1 30	87.13	9 1 30	184.43	10, 10	2-3	400	See	" "	
18	8 6 0	95.46	8 6 0	127.70	10, 10	3	400	See	" "	
18	10 26 45	95.34	10 27 0	122.06	10, 10	2-3	400	See	" "	
19	9 14 0	89.95	9 14 0	112.04	10, 10	2	400	See	" "	Hazy and unsteady.
20	9 54 0	95.85	9 54 0	193.19	10, 10	2	400	See	" "	
21	8 43 0	109.44	8 43 0	225.04	10, 10	3	400	See	" "	
22	8 23 22	139.87	8 23 0	139.93	10, 10	2	400	See	" "	Very much blurred.
23	8 34 38	220.29	8 35 0	100.87	10, 10	3	400	See	" "	Hazy.
24	8 14 38	251.58	8 15 0	103.91	10, 10	3	400	See	" "	
25	8 33 0	243.04	8 33 0	66.80	10, 10	3	400	See	" "	
27	9 55 45	268.26	9 55 45	224.18	10, 10	3	400	See	" "	
28	8 44 30	283.37	8 44 30	250.11	10, 10	3	400	See	" "	

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SATELLITES OF SATURN—Continued.

RHEA-TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
Aug. 29	10 3 22	308.72	10 3 0	141.84	10, 10	5	400	See	26-inch	
30	8 25 0	3.18	8 25 0	63.05	10, 10	2–3	400	See	" "	Unsteady, hazy, and fuzzy.
31	8 12 52	18.93	8 12 45	40.20	10, 10	2–3	400	See	" "	
Sept. 4	8 9 0	100.63	8 10 0	246.71	10, 10	2	400	See	" "	Unsteady.
5	8 2 22	117.81	8 2 0	150.35	10, 10	3	400	See	" "	
6	8 8 0	132.72	8 8 0	72.53	10, 10	3	400	See	" "	
7	7 59 52	119.80	8 0 0	90.69	10, 10	3–4	400	See	" "	
11	8 41 30	274.34	8 41 30	204.68	10, 10	2	400	See	" "	Fuzzy and blurred
1903										
May 10	16 35 6	276.29	16 39 26	95.79	4, 8	g	400	Fk.	26-inch	Daylight stopped measures.
19	15 32 13	103.24	15 31 43	235.00	8, 8	b	400	Fk.	" "	
28	15 45 23	326.97	15 45 5	53.09	7, 8	f	400	Fk.	" "	
June 2	16 15 51	97.43	16 15 19	236.62	8, 8	f	400	Fk.	" "	Daylight.
3	15 9 43	107.77	15 10 1	151.33	8, 8	p	400	Fk.	" "	
15	16 1 38	69.72	16 1 18	122.09	8, 8	p	400	Fk.	" "	
21	15 1 2	135.14	15 1 2	111.77	8, 8	f	400	Fk.	" "	
29	13 38 48	319.02	13 37 46	51.34	8, 8	f	400	Fk.	" "	
July 6	15 15 34	105.17	15 16 0	104.68	8, 8	p	400	Fk.	" "	
7	14 33 14	107.20	14 34 18	158.70	8, 8	p	400	Fk.	" "	
9	14 59 26	216.10	15 0 42	96.25	8, 8	b	400	Fk.	" "	Clouds interrupt.
15	12 40 27	296.08	12 40 24	185.77	8, 8	p	400	Fk.	" "	
20	11 16 59	83.99	11 16 55	161.58	8, 8	b	400	Fk.	" "	
21	11 38 32	96.74	11 38 25	258.44	8, 8	g	400	Fk.	" "	
23	11 12 21	144.91	11 12 32	94.50	6, 8	p	400	Fk.	" "	
24	12 25 40	213.12	12 25 12	51.45	8, 8	f	400	Fk.	" "	
27	11 27 0	252.92	11 27 15	158.88	8, 8	b	600	Fk.	" "	
30	12 57 15	304.15	12 57 32	94.11	8, 8	f	200	Fk.	" "	
Aug. 7	11 1 50	102.32	11 1 48	124.92	8, 8	b	400	Fk.	" "	
9	11 22 18	136.44	11 22 7	127.27	8, 8	p	400	Fk.	" "	
11	10 37 32	262.53	10 37 42	177.17	8, 8	b	400	Fk.	" "	
17	11 17 34	31.45	11 17 0	82.78	8, 8	g	400	Fk.	" "	
18	10 26 18	75.16	10 26 20	112.25	8, 8	f	400	Fk.	" "	
20	10 18 54	71.61	10 18 53	93.83	8, 8	p	400	Fk.	" "	
21	10 17 56	87.09	10 18 3	201.75	8, 8	p	400	Fk.	" "	
22	10 9 28	100.23	10 9 37	264.70	8, 8	f	400	Fk.	" "	
23	10 17 30	117.43	10 17 56	182.14	8, 8	f	400	Fk	" "	
24	10 12 40	163.08	10 12 24	69.92	8, 8	p	400	Fk.	" "	
Sept. 2	8 58 52	302.21	8 58 48	110.41	8, 9	f	400	Fk.	" "	
3	8 40 22	1.51	8 40 32	80.05	8, 8	g	400	Fk.	" "	
4	9 21 15	74.58	9 21 40	178.77	8, 8	p	400	Fk.	" "	
6	9 41 40	103.65	9 41 25	154.58	8, 8	b	400	Fk.	" "	
10	8 34 47	150.76	8 34 56	108.46	8, 8	f	400	Fk.	" "	
11	9 17 12	241.50	9 17 6	129.96	8, 8	g	400	Fk.	" "	
12	8 10 52	264.51	8 11 13	157.67	8, 8	p	400	Fk.	" "	
13	8 8 42	268.86	8 8 30	104.31	8, 8	g	400	Fk.	" "	
14	7 40 20	263.37	7 40 37	107.28	8, 8	g	400	Fk.	" "	
15	7 37 30	272.38	7 37 36	195.08	8, 8	f	400	Fk.	" "	
20	7 15 18	64.47	7 15 56	57.83	8, 8	f	400	Fk.	" "	
21	7 27 21	71.29	7 27 6	109.38	8, 8	p	400	Fk.	" "	
25	8 49 0	170.84	8 49 14	54.68	8, 8	g	400	Fk.	" "	
26	7 20 31	206.01	7 20 46	68.70	8, 8	f	400	Fk.	" "	
29	7 46 42	262.98	7 46 47	213.05	8, 8	g	400	Fk.	" "	
30	7 40 18	278.02	7 40 12	232.68	8, 8	f	400	Fk.	" "	
Oct. 7	6 41 45	94.87	6 42 0	199.38	8, 8	f	400	Fk.	" "	
12	7 33 38	173.67	7 34 10	88.74	8, 8	b	400	Fk.	" "	

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SATELLITES OF SATURN—Continued.

RHEA-TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1903	h m s	°	h m s	"						
Oct. 14	6 43 10	264.90	6 42 57	124.67	8,8	g	400	Fk.	26-inch	
1904										
June 12	16 0 54	271.46	16 1 52	204.31	8,8	p	400	Fk.	26-inch	
17	15 45 30	35.68	15 45 0	31.51	8,8	f	400	Fk.	" "	
20	14 36 43	98.52	14 36 23	258.37	8,8	b	400	Fk.	" "	
22	14 56 30	127.60	14 56 47	59.09	8,8	p	400	Fk.	" "	
July 3	15 59 0	81.93	15 59 0	172.10	8,8	p	400	Fk.	" "	
13	13 39 23	261.49	13 39 40	128.10	8,8	b	400	Fk.	" "	
14	14 52 9	273.66	14 51 56	244.15	8,8	f	400	Fk.	" "	
26	11 37 53	128.36	11 38 2	93.89	8,8	p	400	Hd.	" "	
31	12 14 28	279.23	12 14 23	109.55	8,8	p	400	Hd.	" "	
Aug. 3	12 12 31	38.44	12 12 59	78.40	8,8	p	400	Hd.	" "	
12	11 21 49	256.30	11 21 53	71.30	8,8	f	400	Hd.	" "	
15	11 13 46	275.35	11 14 27	262.27	8,8	g	400	Hd.	" "	
16	11 10 1	257.08	11 10 13	213.68	8,8	b	400	Hd.	" "	
21	10 47 9	79.10	10 47 29	167.83	8,8	g	400	Hd.	" "	
23	11 9 22	104.21	11 10 2	213.22	8,10	p	400	Hd.	" "	
24	10 8 25	116.38	10 8 36	103.46	8,8	f	400	Hd.	" "	
28	10 40 10	247.12	10 40 12	133.06	8,8	b	400	Hd.	" "	
Sept. 2	9 40 15	284.90	9 40 37	185.89	8,8	g	400	Hd.	" "	
7	9 16 59	89.17	9 16 56	105.15	8,8	p	400	Hd.	" "	
10	10 25 59	119.90	10 25 54	157.48	8,9	f	400	Hd.	" "	
11	9 13 4	196.57	9 13 18	63.46	8,8	g	400	Hd.	" "	
16	8 56 55	277.78	8 57 7	261.83	8,8	g	400	Hd.	" "	
17	9 4 13	261.64	9 4 27	174.82	8,8	g	400	Hd.	" "	
18	9 14 28	331.14	9 14 39	56.13	8,8	f	400	Hd.	" "	
21	8 46 54	42.17	8 47 11	68.56	8,8	b	400	Hd.	" "	
23	9 10 15	96.22	9 10 14	257.15	8,8	f	400	Hd.	" "	
25	8 39 5	115.74	8 39 29	85.52	8,8	g	400	Hd.	" "	
26	7 56 44	108.81	7 57 17	97.31	8,8	f	400	Hd.	" "	
28	8 9 33	167.26	8 14 17	73.76	4,7	f	400	Hd.	" "	
Oct. 1	9 41 27	278.79	9 41 31	133.93	8,8	p	400	Hd.	" "	
3	8 43 5	277.76	8 43 42	161.58	8,8	p	400	Hd.	" "	
4	7 9 42	287.62	7 10 6	187.94	8,8	..	400	Hd.	" "	
5	8 12 4	325.64	8 12 13	90.65	8,8	f	400	Hd.	" "	
6	8 24 43	68.15	8 24 50	120.53	8,8	p	400	Hd.	" "	
7	8 38 37	87.81	8 38 28	148.49	8,8	e	400	Hd.	" "	
9	8 40 15	86.29	8 40 30	117.43	8,8	e	400	Hd.	" "	
11	6 57 40	104.16	6 58 2	234.81	8,8	p	400	Hd.	" "	
1905										
July 9	14 25 40	98.52	14 25 15	258.06	8,8	e	200	Hd.	26-inch	
17	12 49 31	283.51	12 49 26	154.60	8,8	f	400	Hd.	" "	
18	12 55 22	293.57	12 54 59	58.29	8,8	f	400	Hd.	" "	
25	12 37 42	99.08	12 37 50	106.95	8,8	b	400	Hd.	" "	
26	13 28 1	98.82	13 28 44	164.32	9,9	g	400	Hd.	" "	
31	12 38 43	272.49	12 38 45	103.49	8,8	p	400	Hd.	" "	
Aug. 1	12 48 16	270.73	12 48 29	124.60	8,8	g	400	Hd.	" "	
3	13 23 48	283.08	13 23 59	210.47	8,8	e	400	Hd.	" "	
5	14 2 54	77.57	14 2 53	95.31	8,8	g	400	Hd.	" "	
18	12 13 0	286.75	12 13 25	116.88	8,8	f	400	Hd.	" "	
19	11 22 46	289.55	11 23 6	64.08	8,8	p	400	Hd.	" "	
21	11 43 0	302.63	11 43 31	80.90	8,8	e	400	Hd.	" "	
23	12 15 28	90.00	12 15 49	229.41	8,8	e	400	Hd.	" "	
27	11 53 1	100.32	11 53 5	193.54	8,8	g	400	Hd.	" "	
29	11 5 13	208.62	11 5 36	53.72	8,8	b	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

RHEA–TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1905	h m s	°	h m s	″						
Aug. 31	10 33 12	271.40	10 33 32	134.12	8,8	f	400	Hd.	26-inch	
Sept. 6	10 33 28	78.08	10 33 48	91.72	8,8	f	400	Hd.	" "	
7	11 9 57	81.63	11 10 25	66.02	8,8	f	400	Hd.	" "	
8	10 34 47	75.38	10 35 49	68.65	8,8	e	400	Hd.	" "	
9	11 22 52	87.81	11 22 58	182.73	8,8	e	400	Hd.	" "	
14	10 29 26	123.78	10 29 11	50.73	8,8	p	400	Hd.	" "	
15	11 15 37	185.51	11 15 22	40.23	8,9	e	400	Hd.	" "	
18	11 43 51	281.09	11 43 52	192.06	8,8	e	400	Hd.	" "	
21	9 35 29	287.02	9 35 40	121.48	8,8	f	400	Hd.	" "	
22	9 48 54	320.14	9 48 49	65.29	8,8	p	400	Hd.	" "	
24	8 36 51	91.08	8 37 28	225.27	8,8	p	400	Hd.	" "	
26	9 31 8	98.19	9 31 5	110.54	8,8	e	400	Hd.	" "	
27	8 54 48	96.57	8 54 57	151.37	8,8	f	400	Hd.	" "	
28	9 9 29	102.05	9 9 40	204.74	8,8	f	400	Hd.	" "	
30	9 12 28	236.61	9 12 32	76.68	8,8	f	400	Hd.	" "	
Oct. 1	9 5 56	265.75	9 5 48	142.10	8,8	f	400	Hd.	" "	
4	9 13 28	271.52	9 13 41	187.83	8,8	g	400	Hd.	" "	
5	8 45 37	279.00	8 46 2	244.11	8,8	p	400	Hd.	" "	
7	8 57 35	28.43	8 57 22	44.91	9,8	e	400	Hd.	" "	
8	8 52 27	77.47	8 52 11	74.45	8,8	e	400	Hd.	" "	
9	8 27 25	69.11	8 27 24	43.44	8,8	g	400	Hd.	" "	
14	8 0 53	129.49	8 0 59	57.93	8,8	g	400	Hd.	" "	
16	8 7 1	121.40	8 11 11	67.39	4,8	f	400	Hd.	" "	
17	8 26 19	210.54	8 26 28	49.75	8,8	e	400	Hd.	" "	
1906										
July 19	14 23 57	275.28	14 24 17	96.39	8,8	f	400	Hd.	26-inch	
30	14 24 30	257.95	14 24 24	49.21	8,8	e	400	Hd.	" "	
Aug. 15	13 3 47	102.18	13 3 20	112.09	8,8	e	400	Hd.	" "	
18	12 19 20	274.33	12 16 47	215.63	8,8	g	400	Hd.	" "	
Sept. 1	11 36 14	266.06	11 36 25	57.87	8,8	f	400	Hd.	" "	
5	12 3 53	277.64	12 4 9	238.35	8,8	f	400	Hd.	" "	
6	12 22 46	285.97	12 23 2	91.78	8,8	g	400	Hd.	" "	
7	10 48 27	352.39	10 48 26	12.82	8,8	p	400	Hd.	" "	
9	10 53 46	326.17	10 54 12	21.22	8,8	f	400	Hd.	" "	
12	11 41 24	96.73	11 41 28	237.28	8,8	e	400	Hd.	" "	
19	10 25 46	274.88	10 25 49	186.97	8,8	g	400	Hd.	" "	
Oct. 12	9 37 21	87.56	9 37 18	166.41	8,8	e	400	Hd.	" "	
13	9 6 54	93.87	9 7 10	261.06	8,8	g	400	Hd.	" "	
15	7 46 27	100.98	7 46 36	104.89	6,6	f	400	Hd.	" "	
1907										
July 25	14 25 33	96.61	14 25 52	103.90	8,8	f	400	Hd.	26-inch	
26	14 24 47	96.28	14 24 58	70.07	8,8	f	400	Hd.	" "	
Aug. 4	14 2 2	275.86	14 2 14	183.36	8,8	e	400	Hd.	" "	
7	13 57 48	271.26	13 57 57	72.72	8,8	g	400	Hd.	" "	
11	12 41 52	96.27	12 41 12	163.76	8,8	e	400	Hd	" "	
12	14 24 33	94.39	14 24 34	236.40	8,8	g	400	Hd.	" "	
18	14 4 57	277.27	14 4 57	102.42	8,8	f	400	Hd.	" "	
20	10 51 34	274.55	10 51 37	107.20	8,8	g	400	Hd.	" "	
25	12 27 39	99.09	12 27 46	52.94	8,8	f	400	Hd.	" "	
26	12 9 0	95.68	12 9 0	86.24	8,8	e	400	Hd	" "	
29	11 25 46	94.56	11 25 37	239.04	8,8	g	400	Hd.	" "	
Sept. 1	12 20 11	88.88	12 19 28	30.25	8,8	f	400	Hd.	" "	
7	11 45 48	273.48	11 45 48	145.97	8,8	g	400	Hd.	" "	
8	11 10 22	273.28	11 10 32	74.49	8,8	e	400	Hd.	" "	
13	11 13 43	94.25	11 13 43	221.68	8,8	e	400	Hd	" "	

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SATELLITES OF SATURN—Continued.

RHEA–TITAN—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	h m s	″						
Sept. 14	11 24 4	94.05	11 24 9	138.61	8, 8	e	400	Hd.	26-inch	
16	10 26 59	94.12	10 26 51	199.34	8, 8	g	400	Hd.	" "	
20	11 40 19	274.35	11 40 29	129.51	8, 8	g	400	Hd.	" "	
26	11 5 57	94.49	11 5 43	65.83	8, 9	g	400	Hd.	" "	Titan touching ring.
Oct. 1	11 0 44	94.30	11 0 47	247.94	8, 8	e	400	Hd.	" "	
2	9 55 11	94.51	9 55 13	112.75	8, 8	g	400	Hd.	" "	
10	10 23 49	274.51	10 24 2	88.65	8, 8	g	400	Hd.	" "	
16	10 5 29	94.41	10 5 34	118.04	8, 8	g	400	Hd.	" "	
30	8 19 56	91.58	8 20 8	48.84	8, 8	g	400	Hd.	" "	

RHEA–JAPETUS.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1895	h m s	°	s	h m s	″	″						
Apr. 3	13 40 0	.....	−42.463	13 45 12	.....	+142.90	40, 5	3	400	Br.	26-inch	
4	13 23 36	.....	−38.172	13 36 48	.....	+179.71	20, 5	2	400	Br.	" "	Clouds interfere.
5	11 54 54	.....	−31.234	11 47 48	.....	+177.51	40, 5	2	400	Br.	" "	
11	12 19 58	.....	−27.556	12 19 12	.....	+170.32	38, 5	3	400	Br.	" "	Wind shakes telescope; bright moonlight.
15	11 41 30	.....	−15.017	11 37 30	.....	+176.87	40, 5	3	400	Br.	" "	
17	12 50 18	.....	−18.666	12 50 0	.....	+197.85	42, 4	4	400	Br.	" "	
18	12 18 12	.....	− 9.513	12 14 0	.....	+204.60	40, 5	4	400	Br.	" "	
19	12 23 12	346.80	.....	12 30 0	175.35	.....	3, 4	2	400	Br.	" "	
23	11 31 36	36.20	.....	11 31 12	189.07	.....	7, 5	2	400	Br.	" "	
May 4	11 55 9	.....	+27.024	11 54 0	.....	− 37.05	40, 5	5	400	Br.	" "	
9	10 47 54	.....	+30.336	10 50 54	.....	− 97.91	32, 5	2	400	Br.	" "	Clouds interrupt.
10	10 22 36	.....	+32.611	10 23 48	.....	− 80.73	38, 5	3	400	Br.	" "	
18	9 30 12	.....	+26.045	9 29 36	.....	−184.82	40, 5	2	400	Br.	" "	Wind shakes telescope.
20	9 16 33	.....	+30.689	9 33 0	.....	−158.77	16, 1	2	400	Br.	" "	Clouds interrupt.
22	8 56 6	.....	+21.481	8 56 12	.....	−203.64	40, 5	2	400	Br.	" "	Unsteady and thick.
23	9 52 18	.....	+15.175	9 51 36	.....	−177.07	40, 5	3	400	Br.	" "	Japetus very faint
28	10 20 12	160.99	.....	10 29 30	147.55	.....	4, 5	..	400	Br.	" "	Seeing irregular.
29	8 34 30	140.79	.....	8 42 30	167.09	.....	4, 4	2	400	Br.	" "	Unsteady and diffuse.
June 1	9 36 30	232.37	.....	9 55 42	192.49	.....	4, 6	2	400	Br.	" "	Clouds interrupt.
3	10 6 12	.....	− 5.320	10 4 30	.....	− 89.47	40, 5	3	400	Br.	" "	Seeing variable.
6	9 5 36	.....	−22.424	9 5 0	.....	− 40.22	40, 5	3	400	Br.	" "	
7	8 59 0	265.40	.....	9 9 12	266.99	.....	4, 5	3	400	Br.	" "	
17	9 32 12	.....	−30.149	9 50 48	.....	+ 90.18	20, 4	4	400	Br.	" "	
1898												
May 17	11 58 18	24.23	.....	11 58 48	178.65	.....	6, 5	2	400	Br.	26-inch	Unsteady, diffuse, and thick.
18	12 8 0	59.28	.....	12 8 48	237.65	.....	6, 6	2	400	Br.	" "	Unsteady and diffuse.
31	11 58 24	.....	+38.158	11 26 30	.....	− 50.97	22, 5	1–2	200	Br.	" "	
June 1	11 16 18	.....	+41.670	11 17 6	.....	−107.77	30, 6	3–1	200	Br.	" "	Record changed five rev.
6	10 58 0	.....	+38.878	10 55 54	.....	−184.40	32, 5	5	200	Br.	" "	
7	11 20 2	.....	+30.518	11 19 30	.....	−185.15	32, 5	4	200	Br.	" "	
8	10 15 12	.....	+28.459	10 15 0	.....	−149.00	42, 5	4	200	Br.	" "	
9	10 11 45	.....	+33.908	10 11 24	.....	−145.50	32, 5	3	200	Br.	" "	

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SATELLITES OF SATURN—Continued.

RHEA–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	Δα	WASHINGTON MEAN TIME.	DISTANCE.	Δδ	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1898	h m s	°	s	h m s	"	"						
June 11	10 29 12	.....	+28.591	10 28 30	.....	−221.84	32,5	4	200	Br.	26-inch	Rhea one magnitude brighter than Japetus
14	10 24 12	.....	+26.806	10 13 36	.....	−176.98	34,5	3	200	Br.	" "	Japetus somewhat fainter than Rhea
20	10 3 0	158.34	.....	10 0 54	215.16	.....	8,7	2	200	Br.	" "	Clouds interrupt
21	9 58 54	196.02	.....	9 57 30	167.11	.....	8,6	3	200	Br.	" "	
22	10 19 0	200.15	.....	10 19 0	121.38	.....	8,6	3	200	Br.	" "	
23	9 10 24	174.86	.....	9 10 30	120.03	.....	8,6	..	200	Br.	" "	
24	8 54 12	192.69	.....	8 55 12	155.92	.....	8,6	2	200	Br.	" "	
24	9 20 48	193.54	.....	9 21 0	156.25	.....	7,6	2	400	Br.	" "	
26	10 15 24	.....	−17.726	10 15 42	.....	− 80.97	36,6	3	200	Br.	" "	
29	9 48 49	.....	−19.929	9 39 54	.....	− 92.26	32,6	3	200	Br.	" "	
30	9 9 36	.....	−28.246	9 8 30	.....	− 49.55	32,6	4	200	Br.	" "	Rhea one magnitude brighter than Japetus
July 1	9 29 14	.....	−27.902	9 28 48	.....	+ 5.20	32,6	3	200	Br.	" "	Japetus as bright as Tethys
2	10 8 51	.....	−22.889	10 8 36	.....	+ 5.36	32,6	3	200	Br.	" "	Rhea one magnitude brighter than Japetus
7	9 4 24	.....	−29.379	9 3 48	.....	+ 60.03	32,6	3	200	Br.	" "	Japetus one-half magnitude fainter than Rhea.
8	8 41 18	.....	−34.591	8 39 30	.....	+ 43.48	32,6	3	200	Br.	" "	Japetus still fainter than Rhea
15	9 22 51	.....	−35.249	9 34 42	.....	+192.87	16,6	2	200	Br.	" "	Clouds, satellites difficult.
18	8 57 42	.....	−37.834	8 57 0	.....	+170.93	34,6	4	200	Br.	" "	Japetus a little brighter than Rhea.
21	9 2 6	.....	−23.523	9 0 30	.....	+170.67	34,6	3	200	Br.	" "	
23	8 37 52	.....	−29.364	8 36 48	.....	+206.92	32,6	3	200	Br.	" "	Japetus a little brighter than Rhea.
24	8 47 15	.....	−21.463	8 46 48	.....	+227.67	32,6	3	200	Br.	" "	
25	8 58 16	.....	−14.107	8 55 30	.....	+195.67	34,6	3	200	Br.	" "	Japetus not quite as bright as Rhea.
28	8 9 30	318.21	.....	8 19 24	344.35	.....	4,6	3	200	Br.	" "	Clouds interrupt
29	8 4 24	337.19	.....	8 4 42	214.82	.....	8,6	4	200	Br.	" "	
Aug. 3	8 16 54	46.11	.....	8 18 30	191.72	.....	8,6	3	200	Br.	" "	
5	7 55 24	39.37	.....	7 56 12	119.09	.....	9,6	3	400	Br.	" "	
15	8 5 44	.....	+26.262	8 5 6	.....	− 10.00	34,6	3	200	Br.	" "	
16	8 14 24	.....	+34.121	8 13 12	.....	− 25.01	32,6	3	200	Br.	" "	

TITAN–HYPERION.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1900	h m s	°	h m s	"						
Apr. 7	16 22 48	100.82	16 21 12	176.73	10,5	3-4	400	See	26-inch	
25	16 14 12	11.55	16 16 0	76.60	8,5	2-3	400	See	" "	
1901										
Apr. 28	15 41 0	249.55	15 40 36	118.77	10,10	4	400	See	26-inch	Hyperion not very difficult.
29	15 3 6	261.65	15 4 0	141.97	10,10	3-4	400	See	" "	

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SATELLITES OF SATURN—Continued.

TITAN-HYPERION—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
May 13	14 58 12	330.66	14 58 30	75.38	10, 10	4	400	See	26-inch	
14	15 20 48	10.19	15 20 30	67.46	8, 10	4	400	See	" "	Hazy; Hyperion faint.
15	14 59 12	48.67	14 59 24	87.07	10, 10	4	400	See	" "	
23	14 48 48	201.84	14 49 24	112.65	10, 10	2	400	See	" "	
June 9	13 40 30	137.71	13 40 12	220.55	10, 10	2–3	400	See	" "	
10	13 31 54	175.88	13 32 30	164.28	10, 10	4	400	See	" "	
18	13 9 0	305.50	13 4 30	255.77	10, 10	3–4	400	See	" "	
24	12 26 54	91.06	12 26 30	263.05	11, 10	2–3	400	See	" "	Hazy; Hyperion difficult.
27	12 20 6	124.30	12 20 0	157.19	10, 5	3–4	400	See	" "	
July 5	11 37 36	285.13	11 37 30	141.06	10, 10	2–3	400	See	" "	Hyperion faint.
9	11 14 42	300.30	11 14 42	48.09	10, 10	2–3	400	See	" "	
10	10 34 6	293.45	10 34 30	48.46	10, 10	3	400	See	" "	
15	10 44 36	317.40	10 44 42	78.87	10, 10	4	400	See	" "	
20	10 33 6	101.59	10 33 6	147.22	10, 10	3	400	See	" "	
21	10 30 18	97.21	10 30 36	170.28	10, 10	4	400	See	" "	
23	10 27 0	119.12	10 28 6	151.81	10, 10	3–4	400	See	" "	
Aug. 7	10 17 24	80.14	10 17 12	330.17	10, 10	4–5	400	See	" "	
8	10 46 0	90.68	10 46 12	372.92	10, 10	3–4	400	See	" "	
9	9 58 36	99.69	9 58 48	375.41	10, 10	4	400	See	" "	
19	9 39 42	287.55	9 40 12	362.60	10, 10	2–3	400	See	" "	
20	9 8 48	297.15	9 10 30	303.46	10, 10	4	400	See	" "	
21	9 17 42	312.56	9 17 24	229.37	10, 10	4	400	See	" "	
22	10 1 54	339.99	10 1 30	161.49	10, 10	2–3	400	See	" "	Hyperion difficult.
Sept. 3	8 45 6	257.90	8 45 0	165.51	10, 10	4	400	See	" "	Excellent measures.
4	8 58 12	267.41	8 58 6	180.06	10, 10	4	400	See	" "	Good measures.
6	9 1 0	281.21	9 1 0	159.42	10, 10	4	400	See	" "	Excellent measures.
7	8 36 30	288.03	8 36 30	131.94	10, 10	2–3	400	See	" "	Tremulous.
8	7 31 0	294.68	7 32 30	103.74	10, 10	2	400	See	" "	Very tremulous.
9	8 44 0	301.93	8 44 0	73.02	10, 10	3–4	400	See	" "	
12	7 14 36	296.03	7 14 42	42.19	10, 10	3	400	See	" "	
1902										
May 1	15 49 30	276.27	15 54 0	353.91	5, 5	2–3	400	See	26-inch	
4	15 6 15	299.48	15 7 0	215.67	10, 10	2–3	400	See	" "	
6	15 28 8	354.77	15 29 30	142.02	10, 10	3–4	400	See	" "	
9	15 17 25	83.38	15 17 15	176.90	10, 10	2–3	400	See	" "	Hyperion difficult.
28	14 25 30	278.22	14 25 45	162.47	10, 10	2–3	400	See	" "	Hyperion difficult.
June 1	14 24 22	331.53	14 24 30	91.11	10, 10	5	400	See	" "	
5	14 58 0	89.32	14 58 0	211.60	10, 10	2–3	400	See	" "	Good measures.
8	14 12 45	115.48	14 12 30	209.27	10, 10	2–3	400	See	" "	
10	13 54 0	162.77	13 54 0	126.10	10, 10	3	400	See	" "	
July 11	10 58 15	69.77	10 58 45	152.71	10, 10	3–4	400	See	" "	Hyperion very close to Japetus.
12	11 6 30	82.89	11 6 30	180.42	10, 10	2–3	400	See	" "	Hyperion follows Japetus about 20".
13	10 32 0	92.11	10 32 0	187.36	10, 10	3	400	See	" "	
14	10 19 30	100.88	10 19 0	173.00	10, 10	3	400	See	" "	
16	11 23 0	125.92	11 23 0	99.12	10, 10	3–4	400	See	" "	
22	10 22 0	267.18	10 22 0	93.73	10, 10	3	400	See	" "	Hyperion difficult, but clearly seen.
31	9 39 45	278.96	9 39 30	177.55	10, 10	3–4	400	See	" "	
Aug. 2	10 23 0	295.54	10 23 0	166.87	10, 10	3	400	See	" "	
7	10 48 0	79.70	10 48 0	188.93	10, 10	2	400	See	" "	
12	10 15 8	137.83	10 16 0	164.80	10, 10	2–3	400	See	" "	Hyperion difficult.
21	10 33 15	301.20	10 33 0	293.89	10, 10	3	400	See	" "	
22	9 29 0	319.63	9 29 30	214.59	10, 10	2	400	See	" "	
24	9 0 0	43.91	9 0 0	185.48	10, 10	3	400	See	" "	
25	10 32 22	70.56	10 32 30	269.88	10, 10	3	400	See	" "	
28	9 13 0	101.37	9 13 0	372.47	10, 10	3	400	See	" "	
29	10 27 0	111.98	10 27 0	323.74	10, 10	5	400	See	" "	

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SATELLITES OF SATURN—Continued.

TITAN-HYPERION—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	"						
Aug. 30	8 47 52	125.13	8 48 30	250.94	10, 10	2–3	400	See	26-inch	Hazy and unsteady.
31	8 44 0	152.64	8 44 30	176.44	10, 10	2–3	400	See	" "	
Sept. 4	8 27 0	264.00	8 27 30	336.96	10, 10	2	400	See	" "	Unsteady and blurred.
5	8 20 30	271.85	8 20 30	362.20	10, 10	3	400	See	" "	
6	8 29 0	278.62	8 29 30	354.00	10, 10	2	400	See	" "	
7	8 59 52	285.86	9 0 0	317.40	10, 10	3–4	400	See	" "	
1903										
July 24	13 28 45	289.35	13 40 7	290.59	4, 8	f	400	Fk.	26-inch	Hyperion very difficult.
Aug. 17	11 54 7	273.85	11 57 37	124.08	8, 8	g	400	Fk.	" "	
Sept. 11	10 19 30	53.92	10 18 0	180.76	9, 8	g	400	Fk.	" "	Hyperion very difficult.
12	9 37 35	75.38	9 37 20	268.99	8, 8	f	400	Fk	" "	
13	9 5 55	86.64	9 6 0	341.67	8, 8	g	400	Fk.	" "	
14	8 48 8	94.57	8 47 58	380.17	8, 8	g	400	Fk.	" "	
15	8 52 7	102.06	8 52 25	375.00	8, 8	f	400	Fk.	" "	
21	8 18 46	253.88	8 19 6	274.22	8, 8	f	400	Fk.	" "	
22	8 39 30	263.95	8 39 0	333.22	8, 8	p	400	Fk.	" "	
25	8 15 45	282.96	8 15 58	326.68	8, 8	f	400	Fk.	" "	
Oct. 13	7 28 40	268.74	7 28 40	81.58	8, 8	b	400	Fk.	" "	Possibly not Hyperion.
14	7 19 27	268.02	7 19 54	64.68	10, 8	f	400	Fk.	" "	
18	7 5 0	261.86	7 6 26	81.22	8, 8	b	400	Fk.	" "	Hyperion difficult.
20	6 45 26	272.73	6 44 19	130.13	8, 8	b	400	Fk.	" "	
21	7 0 48	278.46	7 1 0	144.94	8, 8	p	400	Fk.	" "	Hyperion exceedingly difficult.
1904										
Aug. 12	12 3 41	296.20	12 4 31	154.87	8, 8	e	400	Hd.	26-inch	
Sept. 2	9 57 58	259.75	9 58 51	117.88	8, 8	g	400	Hd.	" "	
10	8 49 40	62.62	8 50 46	104.81	8, 8	f	400	Hd.	" "	
11	8 34 36	80.19	8 35 18	169.73	8, 8	g	400	Hd.	" "	
16	10 33 49	115.64	10 34 29	229.18	8, 8	g	400	Hd.	" "	
30	8 29 58	83.69	8 30 45	307.25	8, 8	b	200	Hd.	" "	Hyperion very faint.
Oct. 1	8 9 54	91.29	8 9 50	370.37	8, 13	p	400	Hd.	" "	
3	7 45 5	103.19	7 47 5	365.41	8, 8	p	400	Hd.	" "	
4	8 39 39	111.29	8 39 40	297.77	8, 8	..	400	Hd	" "	
5	7 34 16	124.06	7 34 52	212.78	7, 8	f	400	Hd.	" "	Hyperion very faint.
6	7 23 17	154.26	7 24 53	129.45	8, 8	p	400	Hd.	" "	Hyperion very faint.
7	8 0 48	213.76	8 0 50	121.29	8, 8	e	400	Hd.	" "	
10	7 38 33	266.99	7 38 19	303.60	8, 9	f	400	Hd.	" "	
1905										
July 25	12 54 18	348.96	12 55 18	36.85	8, 8	b	400	Hd.	26-inch	
31	13 12 59	98.14	13 13 24	310.50	8, 8	p	200	Hd.	" "	
Aug. 6	12 38 4	263.14	12 39 11	265.04	8, 10	p	200	Hd.	" "	
21	11 29 24	119.92	11 29 27	171.58	8, 10	e	400	Hd.	" "	
27	10 52 48	273.96	10 53 29	306.36	8, 8	g	200	Hd.	" "	
29	10 45 46	281.55	10 45 48	230.60	8, 8	p	400	Hd.	" "	
30	10 11 23	287.88	10 11 56	161.05	8, 8	b	400	Hd.	" "	
31	10 19 5	304.90	10 18 51	81.74	8, 8	f	400	Hd.	" "	
Sept. 18	10 26 37	194.29	10 27 4	30.17	8, 8	e	400	Hd.	" "	
21	9 19 10	266.86	9 19 36	148.71	8, 8	f	400	Hd.	" "	
22	9 22 26	272.27	9 22 1	185.84	8, 8	p	400	Hd.	" "	Hyperion difficult.
26	8 46 46	120.43	8 46 55	96.68	8, 10	e	400	Hd.	" "	
27	8 40 51	173.05	8 40 43	46.89	8, 8	f	400	Hd.	" "	Hyperion difficult.
28	8 54 29	65.00	8 55 24	88.18	8, 8	f	400	Hd.	" "	
30	8 8 19	88.83	8 8 7	234.15	8, 8	p	400	Hd.	" "	
Oct. 1	8 11 5	93.43	8 11 50	290.22	8, 8	f	200	Hd.	" "	
3	9 58 7	101.32	9 59 40	319.97	8, 8	p	200	Hd.	" "	
21	7 13 54	98.84	7 15 9	390.28	8, 8	f	200	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TITAN-HYPERION—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1905	h m s	°	h m s	″						
Oct. 30	7 18 24	274.03	7 18 55	270.90	8, 8	e	200	Hd.	26-inch	
1906										
July 21	13 53 34	93.37	13 53 35	176.45	8, 8	g	400	Hd.	26-inch	
24	15 8 2	97.69	15 8 11	106.24	8, 8	p	400	Hd.	" "	
Sept. 14	11 21 24	273.46	11 22 49	287.17	4, 4	p	400	Hd.	" "	Hyperion very faint.
19	10 45 5	39.11	10 45 16	28.66	8, 8	g	400	Hd.	" "	Hyperion very faint.
Oct. 8	9 51 34	263.62	9 51 35	77.32	6, 6	f	400	Hd.	" "	
15	8 17 25	346.12	8 16 56	27.51	5, 4	f	400	Hd.	" "	
1907										
Aug. 6	13 15 0	95.88	13 14 52	83.01	4, 5	g	400	Hd.	26-inch	Hyperion very faint.
11	13 12 19	92 97	13 12 33	100.91	4, 4	e	400	Hd	" "	
12	14 39 45	93.15	14 39 20	78.65	8, 8	g	400	Hd.	" "	
13	13 41 34	93.85	13 41 13	66.48	8, 8	f	400	Hd.	" "	
31	11 48 33	260.92	11 47 44	17.18	8, 10	g	400	Hd.	" "	
Sept. 7	12 25 33	93.98	12 25 15	370.28	4, 4	e	250	Hd.	" "	
8	12 3 34	93.75	12 5 20	285.52	2, 3	e	250	Hd.	" "	Sky became thick.
13	11 29 34	274.41	11 29 42	346.85	4, 4	e	250	Hd.	" "	
14	11 37 58	274.28	11 37 46	403.73	4, 5	e	250	Hd.	" "	
15	10 22 46	274.26	10 23 4	407.07	4, 5	f	250	Hd.	" "	
26	11 31 2	94.46	11 30 56	275.11	4, 4	g	400	Hd.	" "	
29	10 9 52	268.72	10 10 6	26.03	4, 4	f	400	Hd.	" "	
30	9 42 27	272.85	9 42 46	107.37	4, 4	p	400	Hd.	" "	
Oct. 5	11 18 23	274.20	11 18 15	153.37	4, 4	p	400	Hd.	" "	
6	10 21 44	274.88	10 21 42	98.83	4, 4	f	400	Hd.	" "	
8	9 29 4	89.31	9 29 2	28.25	4, 6	p	400	Hd.	" "	Hyperion faint and diffuse.
9	10 55 18	92.24	10 55 0	84.39	5, 4	g	400	Hd.	" "	
14	9 48 17	93.59	9 47 59	88.61	4, 4	p	400	Hd	" "	

SATURN-HYPERION.

1895										
Mar. 28	12 17 36	86.24	12 17 30	234.42	8, 6	3	400	Br.	26-inch	
Apr. 17	13 27 45	79.69	13 28 15	203.51	8, 10	4	400	Br.	" "	
18	11 35 6	84.75	11 35 30	231.90	8, 5	4	400	Br.	" "	
19	11 17 6	89.21	11 18 0	246.39	6, 6	3	400	Br.	" "	Seeing suddenly grew worse.
May 10	9 23 0	87.59	9 34 45	240.65	4, 6	3	400	Br.	" "	

TITAN-JAPETUS.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	s	h m s	″	″						
Apr. 23	10 22 41	.....	+17.586	10 26 17	.....	−183.72	20, 10	4	400	Br.	26-inch	Record changed
25	9 6 42	170.13	.....	9 3 0	180.13	.....	10, 5	..	400	Br.	" "	one rev.
26	10 3 31	.....	− 5.861	10 3 48	.....	−164.03	20, 6	..	400	Br.	" "	
30	10 25 41	.....	−19.914	10 25 41	.....	− 65.30	26, 5	..	400	Br.	" "	
May 1	9 25 24	.....	−18.767	9 25 6	.....	− 42.60	38, 5	..	400	Br.	" "	Hazy.
12	10 46 22	.....	−42.806	10 47 0	.....	+ 38.89	36, 7	..	400	Br.	" "	
13	9 54 48	.....	−46.595	9 55 6	.....	+ 61.07	40, 6	..	400	Br.	" "	Japetus faint; record changed five rev.

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SATELLITES OF SATURN—Continued.

TITAN-JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	s	h m s	"	"						
May 14	9 23 28	.....	−48.465	9 23 48	.....	+ 85.27	42, 8	..	400	Br.	26-inch	Japetus faint.
15	10 13 53	.....	−48.137	10 16 12	.....	+112.40	32, 6	4	400	Br.	" "	
17	8 49 24	.....	−41.551	.. .. ..	.....	.....	20, .	..	400	Br.	" "	Clouds.
24	8 59 35	.....	−19.402	9 2 24	.....	+145.35	40, 7	..	400	Br.	" "	Unsteady.
25	9 0 21	.....	−21.333	.. .. ..	.....	.....	26, .	..	400	Br.	" "	Clouds.
27	8 36 13	.....	−26.923	8 36 48	.....	+131.24	40, 6	3	400	Br.	" "	
28	9 45 3	.....	−29.170	9 45 42	.....	+135.47	40, 6	2	400	Br.	" "	
29	8 56 16	.....	−29.874	8 57 12	.....	+143.28	42, 7	3	400	Br.	" "	
June 2	8 51 58	.....	−13.555	8 52 6	.....	+178.19	40, 6	3	400	Br.	" "	
5	8 39 23	.....	+ 8.055	8 47 52	.....	+155.66	20, 5	2	400	Br.	" "	Clouds interrupt; Japetus faint.
9	9 40 53	.....	+19.417	9 44 24	.....	+ 66.72	42, 6	2	400	Br.	" "	Japetus barely visible.
11	8 51 48	.....	+16.151	8 52 18	.....	+ 30.87	40, 5	3	400	Br.	" "	
12	9 3 58	.....	+13.709	9 3 48	.....	+ 18.40	44, 6	..	400	Br.	" "	
16	8 47 12	.....	+14.630	8 52 42	.....	+ 12.34	42, 5	3	400	Br.	" "	Hazy; Japetus very faint.
21	9 9 6	.....	+41.055	9 7 30	.....	− 26.51	40, 5	3	400	Br.	" "	Japetus faint.
22	9 13 49	.....	+44.354	9 13 54	.....	− 46.62	38, 5	3	400	Br.	" "	
23	9 1 14	.....	+45.801	9 1 47	.....	− 70.37	40, 6	3	400	Br.	" "	
28	9 6 0	.....	+29.070	9 6 54	.....	−154.89	42, 6	3	400	Br.	" "	
29	9 2 39	.....	+24.293	9 4 31	.....	−156.32	40, 5	4	400	Br.	" "	Japetus faint.
1895												
Mar. 22	12 57 4	.....	−11.477	12 52 0	.....	− 27.67	40, 5	3	400	Br.	26-inch	
23	12 42 24	.....	−14.983	12 38 30	.....	− 33.06	40, 5	2	400	Br.	" "	Japetus faint.
Apr. 3	13 39 51	.....	−34.187	13 35 12	.....	+201.98	40, 5	3	400	Br.	" "	
4	13 23 28	.....	−29.195	13 47 0	.....	+203.97	20, 5	3	400	Br.	" "	Clouds interfere.
5	11 54 46	.....	−25.202	11 56 12	.....	+198.39	40, 5	2	400	Br.	" "	Thick.
11	11 45 30	.....	−29.126	11 45 48	.....	+140.74	40, 5	3	400	Br.	" "	Wind shakes telescope.
15	11 41 46	.....	−31.422	11 45 30	.....	+203.61	40, 5	3	400	Br.	" "	
17	12 14 33	.....	−20.571	12 14 30	.....	+233.08	40, 4	4	400	Br.	" "	
18	12 18 16	.....	−13.108	12 21 12	.....	+235.80	40, 5	4	400	Br.	" "	
19	12 38 12	341.43	.....	12 46 48	241.14	.....	4, 4	2	400	Br.	" "	Record changed
23	12 0 48	61.83	.....	12 0 30	273.61	.....	6, 5	2	400	Br.	" "	four rev.
May 4	11 27 0	.....	+28.175	11 26 30	.....	+ 38.47	40, 4	5	400	Br.	" "	
9	10 47 37	.....	+48.448	10 50 36	.....	− 96.07	32, 5	2	400	Br.	" "	Clouds; Japetus
10	10 22 20	.....	+47.043	10 23 30	.....	−127.47	38, 5	3	400	Br.	" "	faint.
18	9 30 16	.....	+20.747	9 31 24	.....	−141.29	40, 5	2	400	Br.	" "	Wind shakes telescope.
20	9 16 38	.....	+25.683	9 30 36	.....	−126.33	16, 1	2	400	Br.	" "	Clouds interrupt.
22	8 55 54	.....	+30.825	8 54 36	.....	−136.64	40, 5	2	400	Br.	" "	Thick; Japetus faint.
23	9 52 0	.....	+31.848	9 51 36	.....	−151.11	40, 5	3	400	Br.	" "	Thick; Japetus faint.
28	10 0 12	145.89	.....	10 10 30	249.99	.....	4, 5	3	400	Br.	" "	
29	8 51 30	172.06	.....	9 7 0	201.45	.....	4, 5	2	400	Br.	" "	
June 1	9 15 12	243.04	.....	9 26 48	282.23	.....	4, 5	3	400	Br.	" "	
3	10 6 27	.....	−20.132	10 7 18	.....	− 63.86	40, 5	3	400	Br.	" "	
6	9 5 30	.....	−14.754	9 4 48	.....	− 5.08	40, 5	3	400	Br.	" "	
7	8 38 30	270.21	.....	8 49 0	191.11	.....	4, 5	3	400	Br.	" "	Unsteady and
17	9 32 28	.....	−47.075	9 54 48	.....	+ 91.74	20, 4	4	400	Br.	" "	thick.
1896												
Apr. 26	11 59 48	.....	−20.208	11 59 12	.....	− 43.26	44, 5	..	400	Br.	26-inch	W. & S. micrometer; Japetus faint, seeing poor.
May 4	11 22 22	.....	−45.286	11 22 18	.....	+182.04	40, 5	..	400	Br.	" "	Unsteady.

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SATELLITES OF SATURN—Continued.

TITAN–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\alpha$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1896	h m s	°	s	h m s	″	″						
May 6	10 56 46	.....	−35.562	10 56 48	.....	+217.27	44, 5	..	{200 400}	Br.	26-inch	
9	10 33 36	.....	−22.685	10 34 24	.....	+197.28	40, 5	..	400	Br.	" "	Thick; unsteady.
10	10 19 36	.....	−21.052	10 19 12	.....	+179.00	40, 5	..	400	Br.	" "	
11	10 34 40	.....	−21.077	10 37 6	.....	+161.22	36, 5	..	400	Br.	" "	Steady, but thick.
14	11 4 0	.....	−28.826	11 3 42	.....	+139.39	40, 5	4	400	Br.	" "	
16	10 20 16	.....	−33.633	10 31 42	.....	+167.20	20, 5	3	400	Br.	" "	Clouds.
27	10 16 56	.....	+17.535	10 17 0	.....	+ 99.98	40, 5	2	400	Br.	" "	Thick; Japetus faint.
29	10 40 6	78.76	.....	10 40 30	226.81	.....	6, 6	2	400	Br.	" "	Parallel uncertain.
30	9 22 36	80.77	.....	9 23 48	191.35	.....	6, 5	2	400	Br.	" "	Parallel uncertain.
June 2	9 31 12	74.95	.....	9 31 12	140.09	.....	6, 5	..	400	Br.	" "	Clouds.
5	9 5 42	.....	+20.376	8 50 36	.....	+ 56.52	46, 5	4	400	Br.	" "	
10	9 40 45	.....	+46.707	9 38 54	.....	− 60.05	40, 5	1–2	400	Br.	" "	Seeing very poor.
11	9 1 48	.....	+47.598	9 1 54	.....	− 97.92	40, 5	2	400	Br.	" "	Seeing very poor.
12	9 29 26	.....	+46.430	9 32 30	.....	−135.02	40, 5	2	400	Br.	" "	Japetus very faint.
15	8 46 56	.....	+33.546	8 47 30	.....	−198.53	40, 5	3	400	Br.	" "	
17	9 1 52	.....	+23.648	9 3 30	.....	−191.23	40, 5	3	400	Br.	" "	Clouds interrupt.
19	9 42 22	.....	+19.255	9 53 30	.....	−155.85	20, 4	2	400	Br.	" "	Clouds.
20	8 43 54	.....	+19.685	8 43 30	.....	−140.05	42, 5	3	400	Br.	" "	Thin clouds; Japetus faint.
26	9 31 38	.....	+29.825	9 31 36	.....	−171.50	40, 5	3	400	Br.	" "	
29	9 30 36	131.91	.....	9 31 0	330.19	.....	6, 7	4	400	Br.	" "	
30	8 50 48	147.19	.....	8 58 0	264.71	.....	6, 5	4	400	Br.	" "	Unsteady.
July 1	8 52 12	171.93	.....	8 53 12	216.78	.....	6, 5	4	400	Br.	" "	
1901												
Apr. 28	16 28 24	253.57	.....	16 28 30	168.38	.....	10, 10	4	400	See	26-inch	Japetus a shade fainter than Tethys.
29	15 19 24	262.11	.....	15 18 0	168.57	.....	10, 10	4	400	See	" "	Japetus as bright as Dione.
May 3	15 6 0	260.90	.....	15 6 12	81.47	.....	10, 10	3	400	See	" "	Hazy; Japetus about as bright as Dione.
4	15 40 48	247.38	.....	15 41 30	81.51	.....	10, 10	4	400	See	" "	
5	15 35 0	240.55	.....	15 34 12	104.34	.....	10, 10	1–2	400	See	" "	
11	16 24 0	267.14	.....	16 25 42	566.10	.....	7, 7	1–2	400	See	" "	Very unsteady; daylight coming on.
13	13 40 24	273.71	.....	13 40 0	659.70	.....	10, 10	3	400	See	" "	Japetus a shade fainter than Tethys.
14	14 11 6	276.79	.....	14 10 30	669.42	.....	10, 10	4	400	See	" "	Japetus as bright as Rhea.
15	13 52 24	279.53	.....	13 52 24	652.54	.....	10, 10	4	400	See	" "	Japetus 0.5 magnitude brighter than Rhea.
22	13 46 30	279.74	.....	13 46 30	351.33	.....	10, 10	2	400	See	" "	Japetus brighter
23	13 36 30	276.53	.....	13 36 30	372.15	.....	10, 10	4	400	See	" "	than Rhea; not as bright as Titan.
28	13 13 0	280.60	.....	13 13 0	580.49	.....	10, 10	3	400	See	" "	Brightness of Japetus mean between that of Rhea and Titan.
June 3	12 50 24	322.35	.....	12 50 36	234.01	.....	10, 10	2	400	See	" "	Unsteady and hazy.
4	12 27 12	344.72	.....	12 28 12	168.67	.....	10, 10	3–4	400	See	" "	
9	13 5 6	83.23	.....	13 5 6	127.31	.....	10, 10	3	400	See	" "	Japetus of same brightness as Dione.

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SATELLITES OF SATURN—Continued.

TITAN–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
June 10	12 25 12	85.45	12 25 48	98.30	10, 10	3–4	400	See	26-inch	Japetus of same brightness as Dione.
11	11 46 12	48.70	.. .. ..	.....	5, ..	..	400	See	" "	Clouds interrupt.
18	13 31 0	77.57	12 29 12	399.15	5, 10	3–4	400	See	" "	Japetus a shade fainter than Rhea, a little brighter than Dione.
23	12 44 0	97.28	12 52 0	674.90	5, 5	1–2	400	See	" "	Very unsteady; clouds interrupt.
24	13 4 36	100.36	13 3 18	652.14	7, 5	3	400	See	" "	
27	11 37 54	107.62	11 35 48	472.48	10, 10	2–3	400	See	" "	
28	11 41 30	108.29	11 40 48	406.41	10, 10	4	400	See	" "	
30	11 4 54	104.51	11 4 0	327.90	10, 10	2–3	400	See	" "	Japetus decidedly fainter than Tethys.
July 3	11 12 36	95.75	11 12 36	385.20	10, 10	3	400	See	" "	Japetus half as bright as Tethys.
9	11 32 36	111.43	11 32 30	475.10	10, 10	3	400	See	" "	Japetus of same brightness as Tethys.
10	10 51 12	117.90	10 50 30	413.65	10, 10	2–3	400	See	" "	Japetus slightly brighter than Tethys.
15	10 57 18	231.63	10 57 18	188.42	10, 10	4	400	See	" "	Japetus a shade fainter than Tethys.
20	10 44 48	272.12	10 45 0	176.82	10, 10	3	400	See	" "	
21	10 14 12	270.90	10 14 12	147.86	10, 10	3–4	400	See	" "	Japetus about as bright as Dione.
23	10 8 48	256.53	10 8 48	129.54	10, 10	3–4	400	See	" "	Japetus of the same brightness as Rhea.
29	9 52 24	265.52	9 52 42	551.50	10, 10	2–3	400	See	" "	Japetus brighter than Rhea.
30	10 11 42	269.30	10 12 0	628.16	10, 10	1–2	400	See	" "	Japetus about as bright as Rhea.
31	8 56 0	272.63	8 53 7	679.23	10, 10	3	400	See	" "	Japetus as bright as Rhea.
Aug. 1	11 15 48	276.23	11 13 36	706.28	10, 10	4	400	See	" "	
2	10 13 24	279.20	10 11 12	700.93	10, 10	4	400	See	" "	Japetus a little brighter than Rhea.
7	10 39 18	289.63	10 37 30	421.84	10, 10	4–5	400	See	" "	Japetus brighter than Rhea, 0.75 as bright as Titan.
8	10 26 24	288.67	10 26 0	372.99	10, 10	3–4	400	See	" "	Japetus two-thirds as bright as Titan.
9	9 37 6	286.07	9 34 48	345.61	10, 10	3	400	See	" "	Japetus 0.1 magnitude brighter than Rhea.
16	8 31 48	284.17	8 30 54	541.41	10, 10	3–4	400	See	" "	Japetus a shade fainter than Rhea.
19	9 16 36	299.92	9 17 36	416.43	10, 10	2–3	400	See	" "	Clouds.
20	9 23 30	309.10	9 22 54	337.82	10, 10	4	400	See	" "	
21	9 28 48	323.19	9 28 48	257.28	10, 10	4	400	See	" "	
22	9 46 18	345.72	9 46 18	193.45	10, 10	3–4	400	See	" "	Japetus of same brightness as Rhea.
26	8 9 12	74.00	8 9 30	198.94	10, 10	3	400	See	" "	Brightness of Japetus equal to that of Tethys.
27	8 20 6	81.90	8 20 42	190.96	10, 10	3	400	See	" "	Japetus of same brightness as Tethys.
28	8 7 48	86.83	8 7 54	167.77	10, 10	3	400	See	" "	Japetus as bright as Tethys.
29	8 37 48	88.39	8 38 12	135.06	10, 10	5	400	See	" "	Japetus a shade fainter than Tethys; brighter than Enceladus.
30	8 14 0	84.74	8 14 12	106.43	10, 10	3–4	400	See	" "	Japetus a little brighter than Tethys.
Sept. 3	8 25 24	65.38	8 25 24	191.67	10, 10	3	400	See	" "	Japetus decidedly fainter than Tethys, but brighter than Enceladus.
4	8 20 48	70.70	8 21 0	262.63	10, 10	3	400	See	" "	Japetus a little brighter than Enceladus.
6	8 37 6	80.94	8 37 30	431.13	10, 10	4–5	400	See	" "	Japetus of same brightness as Enceladus.
7	8 9 0	85.08	8 11 0	510.96	10, 10	2–3	400	See	" "	Tremulous; Japetus as bright as Tethys.
9	7 47 6	92.53	7 46 0	626.23	10, 10	3–4	400	See	" "	Japetus of same brightness as Enceladus.
12	7 37 30	102.55	7 38 30	612.28	10, 10	3	400	See	" "	Japetus as bright as Enceladus.

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SATELLITES OF SATURN—Continued.

TITAN-JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
20	7 17 0	99.27	7 16 30	310.05	10, 10	2–3	400	See	26-inch	Japetus a shade brighter than Enceladus.
1902										
Apr. 30	15 58 22	44.33	15 58 30	94.47	10, 10	2	400	See	26-inch	
May 1	16 2 54	57.73	16 3 15	151.31	10, 10	2–3	400	See	" "	
5	15 44 30	84.56	15 44 30	484.21	10, 10	2	400	See	" "	
6	15 37 30	88.16	15 44 0	554.78	10, 10	3	400	See	" "	
9	15 38 0	96.98	15 38 30	655.89	10, 10	2–3	400	See	" "	
21	14 45 15	93.88	14 45 30	500.84	10, 10	3–4	400	See	" "	
28	14 11 54	136.23	14 11 30	191.67	10, 10	2–3	400	See	" "	
29	13 57 0	165.90	13 57 0	122.56	10, 10	2–1	400	See	" "	Blurred.
30	14 17 15	212.81	14 17 15	109.42	10, 10	3	400	See	" "	
June 1	14 13 22	257.92	14 13 15	164.27	10, 10	5	400	See	" "	
4	14 3 30	274.53	14 3 15	139.63	10, 10	1–2	400	See	" "	
5	13 46 45	274.21	13 47 0	111.11	10, 10	2–3	400	See	" "	
6	13 25 30	267.76	13 25 30	87.75	10, 10	2–3	400	See	" "	
7	13 41 45	253.76	13 42 0	79.35	10, 10	2	400	See	" "	
8	13 50 52	244.06	13 51 0	98.74	10, 10	2	400	See	" "	
9	13 18 30	243.02	13 18 30	139.11	10, 10	2	400	See	" "	Hazy.
10	13 40 22	247.66	13 41 0	204.21	10, 10	3	400	See	" "	
21	12 11 22	282.62	12 11 15	519.53	10, 10	2	400	See	" "	Unsteady.
23	12 15 30	281.81	12 15 30	402.35	10, 10	3	400	See	" "	
24	12 11 15	279.42	12 11 30	367.64	10, 10	3	400	See	" "	
July 11	10 46 38	71.68	10 46 45	148.85	10, 10	2–3	400	See	" "	
12	10 37 30	82.21	10 37 30	154.43	10, 10	2–3	400	See	" "	Hazy.
13	10 23 0	88.77	10 23 0	141.18	10, 10	3	400	See	" "	
14	10 11 0	92.00	10 11 0	114.09	10, 10	3	400	See	" "	
15	10 24 52	89.62	10 25 0	82.18	10, 10	2	400	See	" "	Unsteady.
16	11 14 30	75.47	11 14 45	60.30	10, 10	3–4	400	See	" "	
22	10 11 15	74.36	10 11 30	224.87	10, 10	2–3	400	See	" "	
31	10 6 30	104.50	10 9 0	480.35	5, 5	3–4	400	See	" "	Clouds interrupt.
Aug. 2	9 35 0	103.74	9 40 0	358.41	5, 10	2–3	400	See	" "	Clouds interrupt.
7	10 30 0	92.96	10 30 0	419.02	10, 10	1–2	400	See	" "	Very unsteady.
12	9 44 0	107.51	9 45 0	467.83	10, 10	2–3	400	See	" "	Hazy.
16	8 44 0	161.48	8 44 30	163.92	10, 10	2	400	See	" "	Blurred; unsteady.
17	8 54 0	22.14	8 54 0	140.55	10, 10	2–3	400	See	" "	
18	8 13 15	233.47	8 13 15	167.68	10, 10	3	400	See	" "	
18	10 39 54	235.94	10 40 0	171.32	10, 10	2–3	400	See	" "	
19	9 26 30	251.80	9 27 0	206.41	10, 10	2	400	See	" "	Unsteady.
21	8 51 0	267.81	8 51 0	227.88	10, 10	3	400	See	" "	
22	9 8 0	272.06	9 8 0	212.03	10, 10	2	400	See	" "	
23	8 40 22	273.98	8 40 0	185.32	10, 10	3	400	See	" "	Hazy.
24	8 20 22	273.19	8 20 0	155.77	10, 10	3	400	See	" "	
25	8 40 0	268.01	8 40 0	132.71	10, 10	3	400	See	" "	
27	10 6 15	252.40	10 6 0	151.09	10, 10	2–3	400	See	" "	Clouds.
28	9 24 45	250.89	9 24 30	196.61	10, 10	3	400	See	" "	
30	9 27 22	256.99	9 27 0	349.28	10, 10	2–3	400	See	" "	
31	9 4 30	260.83	9 4 30	440.62	10, 10	2–3	400	See	" "	
Sept. 5	8 37 15	277.18	8 38 30	690.07	10, 10	3–4	400	See	" "	
6	8 43 22	279.78	8 44 0	662.54	10, 10	2–3	400	See	" "	
7	8 30 0	282.09	8 30 30	614.85	10, 10	3–4	400	See	" "	

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SATELLITES OF SATURN—Continued.

TITAN–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
Sept. 11	9 1 22	284.61	9 0 30	368.03	10, 10	2	400	See	26-inch	
1903										
July 2	14 54 8	157.82	14 53 52	94.22	8, 8	p	400	Fk.	26-inch	
6	12 21 30	270.92	12 21 16	180.19	8, 9	p	400	Fk.	" "	
7	13 9 57	275.45	13 9 41	174.75	8, 8	p	400	Fk.	" "	
8	14 30 11	278.18	14 30 42	151.44	8, 8	p	400	Fk.	" "	
9	13 2 9	278.02	13 2 4	124.01	8, 8	e	400	Fk.	" "	
13	12 20 18	246.78	12 20 16	134.99	8, 8	p	400	Fk.	" "	
15	10 52 20	253.93	10 53 40	270.24	8, 8	b	400	Fk.	" "	
23	12 40 11	277.22	12 39 45	655.07	8, 8	p	400	Fk.	" "	Eyepiece moved back and forth.
24	12 51 53	278.55	12 52 41	596.93	8, 8	f	400	Fk.	" "	Eyepiece moved back and forth.
27	12 15 37	277.82	12 16 2	408.70	8, 8	f	600	Fk.	" "	
28	13 40 35	275.15	13 40 6	370.54	8, 8	f	400	Fk.	" "	
30	12 21 18	269.63	12 21 15	377.20	8, 8	f	200	Fk.	" "	
Aug. 11	9 59 25	329.28	9 59 30	122.31	8, 8	p	400	Fk.	" "	
12	11 14 9	24.60	11 12 0	87.60	7, 8	p	400	Fk.	" "	Clouds interrupt.
17	9 46 55	96.80	9 47 23	129.05	8, 8	g	400	Fk.	" "	
18	9 29 46	95.82	9 29 42	97.18	8, 8	f	400	Fk.	" "	
20	9 43 46	69.63	9 43 49	68.37	8, 8	b	400	Fk.	" "	
21	9 23 50	60.89	9 24 1	91.27	8, 8	f	400	Fk.	" "	
22	9 47 33	62.52	9 47 26	137.88	8, 8	p	400	Fk.	" "	
23	9 55 19	67.78	9 55 2	204.10	8, 8	p	400	Fk.	" "	
24	9 31 30	73.33	9 31 54	285.24	8, 9	f	400	Fk.	" "	
Sept. 1	8 39 9	98.35	8 47 22	620.38	4, 8	p	400	Fk.	" "	Clouds; difficult.
2	9 24 34	99.98	9 24 6	553.80	8, 8	f	400	Fk.	" "	
3	9 35 55	100.94	9 36 38	480.66	8, 10	f	200	Fk.	" "	Very difficult.
10	9 20 40	89.65	9 21 0	401.83	8, 8	p	400	Fk.	" "	
11	9 47 5	91.26	9 47 15	445.77	8, 8	g	400	Fk.	" "	
12	9 10 14	93.34	9 10 30	479.88	8, 8	f	200	Fk.	" "	
13	8 40 33	95.98	8 40 48	496.87	8, 8	g	400	Fk.	" "	
14	8 3 48	99.09	8 4 0	491.75	8, 8	g	400	Fk.	" "	
15	8 6 43	102.88	8 7 0	458.24	8, 8	f	400	Fk.	" "	
19	8 9 24	150.89	8 9 34	136.57	8, 8	p	400	Fk.	" "	
20	7 3 44	198.38	7 4 22	105.51	8, 8	p	400	Fk.	" "	
21	7 8 6	238.30	7 8 23	140.57	8, 8	b	400	Fk.	" "	
22	7 31 0	255.99	7 31 8	187.63	8, 8	g	400	Fk.	" "	
23	7 48 42	265.03	7 48 35	217.04	8, 8	b	400	Fk.	" "	
24	6 55 7	270.22	6 55 14	224.78	8, 8	b	400	Fk.	"	
25	6 54 40	273.95	6 54 36	213.21	8, 8	f	400	Fk.	" "	
26	6 47 0	275.84	6 47 2	188.20	8, 8	g	400	Fk.	" "	
29	6 44 10	262.74	6 44 14	123.00	8, 8	g	400	Fk.	" "	
30	6 39 54	254.79	6 41 18	136.70	8, 8	f	400	Fk.	" "	
Oct. 13	6 59 16	281.12	6 59 23	480.81	8, 8	b	400	Fk.	" "	
14	7 45 40	281.07	7 46 16	414.99	8, 8	g	400	Fk.	" "	
20	7 16 24	270.30	7 17 4	416.81	9, 8	p	400	Fk.	" "	
1904										
June 22	15 16 27	276.88	15 16 41	452.49	8, 8	p	400	Fk.	26-inch	Eyepiece moved in measuring distance.
July 3	14 20 4	110.68	14 19 37	41.57	8, 8	p	400	Fk.	" "	

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SATELLITES OF SATURN—Continued.

TITAN-JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904	h m s	°	s	h m s	"	"						
July 26	12 18 58	85.68	.....	12 20 25	468.33	.....	8, 8	p	400	Hd.	26-inch	Eyepiece moved in measuring distance.
31	13 17 31	97.04	.....	13 17 28	471.11	.....	8, 8	p	400	Hd.	" "	Eyepiece moved in measuring distance.
Aug. 3	12 54 22	112.10	.....	12 54 39	173.58	.....	8, 8	p	400	Hd.	" "	
12	10 57 10	277.63	.....	10 57 43	109.76	.....	8, 8	g	400	Hd.	" "	
15	11 27 49	251.38	.....	11 28 6	131.90	.....	8, 8	g	400	Hd.	" "	
16	11 24 42	252.63	.....	11 24 50	192.16	.....	8, 8	b	400	Hd.	" "	
21	11 6 0	268.25	.....	11 7 5	642.31	.....	8, 8	g	400	Hd.	" "	Eyepiece moved in measuring distance.
23	11 31 29	272.08	.....	11 31 46	712.83	.....	7, 8	p	400	Hd.	" "	Eyepiece moved in measuring distance.
24	10 51 42	273.55	.....	10 52 18	704.41	.....	8, 8	f	200	Hd.	" "	
28	11 21 15	275.20	.....	11 24 18	471.27	.....	8, 8	b	200	Hd.	" "	
Sept. 2	10 46 21	265.37	.....	10 46 26	405.69	.....	8, 8	g	200	Hd.	" "	
7	10 6 38	273.74	.....	10 7 19	570.91	.....	8, 8	g	200	Hd.	" "	
10	11 0 42	282.46	.....	11 0 57	393.93	.....	8, 8	f	200	Hd.	" "	
11	11 4 46	257.06	.....	11 5 2	292.87	.....	8, 8	e	400	Hd.	" "	
16	9 7 16	88.28	.....	9 7 19	153.16	.....	8, 9	g	400	Hd.	" "	
17	9 14 48	94.24	.....	9 14 59	172.77	.....	8, 8	g	400	Hd.	" "	
18	9 53 30	98.04	.....	9 53 39	166.65	.....	8, 8	f	400	Hd.	" "	
21	8 34 24	93.69	.....	8 34 40	83.79	.....	8, 8	b	400	Hd.	" "	
23	9 24 6	69.06	.....	9 24 17	90.87	.....	8, 8	f	400	Hd.	" "	
25	9 16 36	71.04	.....	9 16 31	193.42	.....	8, 8	g	400	Hd.	" "	
26	9 3 8	75.35	.....	9 2 42	271.87	.....	8, 8	b	400	Hd.	" "	
30	9 1 41	88.11	.....	9 2 3	612.07	.....	8, 8	b	200	Hd.	" "	Bright wires.
Oct. 1	8 31 59	90.34	.....	8 32 8	657.27	.....	8, 8	p	200	Hd.	" "	Bright wires.
3	8 11 58	93.94	.....	8 14 44	657.59	.....	8, 8	p	200	Hd.	" "	Bright wires.
4	8 10 42	95.32	.....	8 10 27	616.29	.....	8, 8	..	200	Hd.	" "	Bright wires.
6	9 14 20	96.74	.....	9 15 30	476.08	.....	8, 8	f	400	Hd.	" "	
7	8 57 18	96.05	.....	8 57 58	407.89	.....	8, 8	e	400	Hd.	" "	
9	9 7 17	91.22	.....	9 7 32	315.09	.....	8, 8	e	400	Hd.	" "	
10	8 11 40	88.14	.....	8 11 52	304.84	.....	8, 8	f	200	Hd.	" "	Bright wires.
11	7 17 5	86.04	.....	7 17 8	314.82	.....	8, 8	p	400	Hd.	" "	
1905												
July 17	13 3 48	261.12	.....	13 4 5	372.75	.....	8, 8	f	200	Hd.	26-inch	
18	13 29 44	260.78	.....	13 29 58	403.16	.....	8, 8	f	200	Hd.	" "	
25	13 22 46	270.09	.....	13 22 55	548.43	.....	8, 8	f	200	Hd.	" "	
26	13 44 54	270.94	.....	13 46 29	472.98	.....	8, 8	g	200	Hd.	" "	
31	12 50 20	121.88	.....	12 50 22	41.35	.....	8, 8	p	400	Hd.	" "	
Aug. 1	12 59 40	109.01	.....	12 59 39	103.14	.....	8, 8	g	400	Hd.	" "	
3	13 36 56	155.82	.....	13 36 59	178.25	.....	8, 9	e	400	Hd.	" "	
5	13 51 6	113.74	.....	13 51 15	92.57	.....	8, 8	g	400	Hd.	" "	
18	12 33 43	.....	+47.500	12 33 43	.....	− 9.38	25, 5	f	400	Hd.	" "	
19	11 3 24	.....	+45.547	11 3 24	.....	−13.99	25, 5	p	400	Hd.	" "	
21	12 23 57	.....	+36.685	12 23 57	.....	− 7.77	25, 5	e	400	Hd.	" "	
23	12 39 9	87.44	.....	12 39 22	401.87	.....	8, 8	e	200	Hd.	" "	
27	12 15 37	80.16	.....	12 15 37	376.43	.....	8, 8	g	200	Hd.	" "	
29	11 20 52	82.80	.....	11 21 2	464.95	.....	8, 8	b	200	Hd.	" "	
30	10 28 51	84.60	.....	10 29 23	508.29	.....	8, 8	b	200	Hd.	" "	
31	11 19 55	86.59	.....	11 20 18	542.18	.....	8, 8	p	200	Hd.	" "	
Sept. 6	10 50 44	96.88	.....	10 51 3	175.66	.....	8, 8	f	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TITAN–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1905	h m s	°	s	h m s	"	"						
Sept. 7	11 21 24	101.39	.....	11 21 51	58.28	.....	8,8	f	400	Hd.	26-inch	
8	10 24 3	271.02	.....	10 24 1	39.82	.....	8,8	e	400	Hd.	" "	
9	11 34 17	277.22	.....	11 34 14	123.78	.....	8,8	e	400	Hd.	" "	
14	10 39 54	282.88	.....	10 40 8	151.68	.....	8,8	p	400	Hd.	" "	
15	11 4 2	280.38	.....	11 4 9	119.59	.....	8,8	e	400	Hd.	" "	
18	10 39 24	256.84	.....	10 39 32	127.61	.....	8,8	e	400	Hd.	" "	
21	10 4 56	261.56	.....	10 5 11	356.71	.....	8,8	f	200	Hd.	" "	
22	10 3 33	264.06	.....	10 3 27	458.75	.....	8,8	p	200	Hd.	" "	
24	9 25 50	.....	−43.212	9 25 50	.....	− 23.38	25,5	f	200	Hd.	" "	
25	9 58 21	.....	−46.979	9 58 21	.....	− 6.98	25,5	p	200	Hd.	" "	
26	9 47 53	.....	−48.599	9 47 53	.....	+ 6.89	25,5	e	200	Hd.	" "	
27	9 40 49	.....	−48.171	9 40 49	.....	+ 17.60	25,5	p	200	Hd.	" "	
28	9 37 42	.....	−45.768	9 37 42	.....	+ 24.01	25,5	g	200	Hd.	" "	
30	9 30 4	.....	−37.383	9 30 4	.....	+ 19.14	25,5	f	200	Hd.	" "	
Oct. 1	10 13 6	.....	−32.464	10 13 6	.....	+ 7.84	25,5	f	200	Hd.	" "	
4	9 31 44	.....	−24.135	9 31 44	.....	− 37.23	18,6	g	200	Hd.	" "	
5	9 12 35	.....	−24.594	9 12 35	.....	− 48.91	18,6	p	200	Hd.	" "	
7	9 12 50	.....	−29.800	9 12 50	.....	− 54.32	25,5	e	200	Hd.	" "	
8	9 11 22	.....	−33.329	9 11 22	.....	− 47.62	25,5	e	200	Hd.	" "	
9	8 42 17	.....	−36.267	8 42 17	.....	− 35.57	25,5	g	200	Hd.	" "	
14	8 16 41	.....	−27.007	8 16 41	.....	+ 34.48	25,5	g	200	Hd.	" "	
17	8 43 46	287.02	.....	8 43 47	76.15	.....	8,8	e	400	Hd.	" "	
21	7 32 8	224.84	.....	7 32 27	159.52	.....	8,8	f	400	Hd.	" "	
1906												
July 19	15 4 14	.....	+35.602	15 4 14	.....	+ 56.48	25,5	f	175	Hd.	26-inch	Bright wires.
24	15 22 21	33.36	.....	15 22 26	79.68	.....	8,8	b	400	Hd.	" "	
30	14 11 35	296.52	.....	14 11 33	124.81	.....	8,8	e	400	Hd.	" "	
Aug. 15	13 21 56	.....	−39.123	13 21 56	.....	− 27.27	25,5	e	175	Hd.	" "	Bright wires.
18	12 39 2	261.22	.....	12 39 17	404.44	.....	8,8	g	175	Hd.	" "	
Sept. 1	11 58 54	254.43	.....	11 58 40	167.06	.....	8,8	f	400	Hd	" "	
3	11 39 21	143.80	.....	11 39 38	70.23	.....	8,8	p	400	Hd.	" "	
4	11 18 11	119.59	.....	11 18 12	123.96	.....	8,8	p	400	Hd.	" "	
5	12 19 45	113.45	.....	12 19 47	159.01	.....	8,8	f	400	Hd.	" "	
7	10 36 22	112.02	.....	10 36 30	148.26	.....	8,8	p	400	Hd.	" "	
9	10 37 54	113.18	.....	10 37 11	84.97	.....	8,8	p	400	Hd.	" "	Bright wires.
11	10 59 4	93.73	.....	10 58 59	55.89	.....	8,8	p	400	Hd.	" "	Bright wires.
12	11 30 55	82.83	.....	11 31 2	80.90	.....	8,8	e	400	Hd.	" "	
19	11 9 55	.....	+44.916	11 9 55	.....	+ 21.28	25,5	g	175	Hd.	" "	Bright wires.
23	10 41 14	.....	+42.120	10 41 14	.....	+ 20.23	25,5	p	175	Hd.	" "	Bright wires.
Oct. 7	10 1 1	.....	+32.451	10 1 1	.....	+ 31.84	25,5	f	175	Hd.	" "	Bright wires.
12	9 47 41	320.62	.....	9 47 50	52.54	.....	8,8	e	400	Hd.	" "	
13	9 18 9	292.76	.....	9 18 6	123.25	.....	8,8	g	400	Hd.	" "	
14	8 44 32	287.49	.....	8 44 38	176.62	.....	6,6	e	400	Hd.	" "	
15	7 59 59	285.78	.....	8 0 14	204.90	.....	6,6	f	400	Hd.	" "	
1907												
July 25	14 41 23	136.27	.....	14 41 33	73.19	.....	8,8	f	400	Hd.	26-inch	Bright wires.
26	14 36 30	148.24	.....	14 36 39	49.30	.....	8,8	f	400	Hd.	" "	
Aug. 6	14 9 23	.....	+45.719	14 9 23	.....	+ 30.79	15,5	f	400	Hd.	" "	Bright wires.
7	14 13 6	.....	+44.959	14 13 6	.....	+ 43.38	15,5	g	400	Hd.	" "	Bright wires.
11	12 58 38	.....	+29.517	12 58 38	.....	+ 92.68	15,5	e	400	Hd.	" "	Bright wires.
12	14 53 49	.....	+25.783	14 53 49	.....	+101.32	15,5	g	400	Hd.	" "	Bright wires.
13	13 25 14	.....	+23.829	13 25 14	.....	+106.79	15,5	f	400	Hd.	" "	Bright wires.
20	12 2 19	.....	+38.977	12 2 19	.....	+ 99.78	15,5	e	400	Hd.	" "	Bright wires
29	11 40 16	317.40	.....	11 40 30	144.63	.....	8,8	g	400	Hd.	" "	
30	12 26 46	304.86	.....	12 26 59	173.33	.....	8,8	f	400	Hd.	" "	

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SATELLITES OF SATURN—Continued.

TITAN–JAPETUS—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	$\Delta\alpha$	WASHINGTON MEAN TIME.	DISTANCE.	$\Delta\delta$	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	s	h m s	″	″						
Aug. 31	11 28 28	299.90	.....	11 28 19	181.37	.....	8, 8	g	400	Hd.	26-inch	
Sept. 1	12 3 7	297.92	.....	12 3 22	169.10	.....	8, 8	p	400	Hd.	" "	Bright wires.
5	11 8 41	302.14	.....	11 8 50	59.13	.....	8, 8	f	400	Hd.	" "	
6	11 25 23	290.12	.....	11 25 53	64.44	.....	8, 10	p	400	Hd.	" "	Bright wires.
7	11 35 22	278.41	.....	11 35 32	101.25	.....	8, 8	g	400	Hd.	" "	
8	11 19 59	273.25	.....	11 19 56	168.65	.....	8, 8	e	400	Hd.	" "	
13	11 44 59	.....	−43.659	11 44 59	.....	− 9.82	15, 5	e	400	Hd.	" "	
14	11 57 4	.....	−46.879	11 57 4	.....	−16.86	15, 5	e	400	Hd.	" "	
16	10 46 4	.....	−47.027	10 46 4	.....	−35.56	15, 5	g	400	Hd.	" "	
20	11 54 14	.....	−30.837	11 54 14	.....	−82.59	15, 5	g	400	Hd.	" "	
29	10 39 39	.....	−40.539	10 39 39	.....	−87.94	15, 5	f	400	Hd.	" "	
30	10 20 54	.....	−40.002	10 20 54	.....	−86.07	15, 5	p	400	Hd.	" "	
Oct. 1	11 13 27	.....	−37.244	11 13 27	.....	−85.20	15, 5	e	400	Hd.	" "	
2	10 8 9	.....	−32.774	10 8 9	.....	−85.80	15, 5	g	400	Hd.	" "	
5	11 29 8	240.14	.....	11 29 9	183.71	.....	8, 8	p	400	Hd.	" "	
6	10 32 53	208.62	.....	10 33 5	105.45	.....	8, 8	f	400	Hd.	" "	
8	9 16 42	127.79	.....	9 17 15	145.36	.....	8, 8	p	400	Hd.	" "	
9	11 7 30	117.48	.....	11 7 36	179.34	.....	8, 8	g	400	Hd.	" "	
10	10 33 45	113.74	.....	10 34 3	184.49	.....	8, 8	f	400	Hd.	" "	
14	9 36 27	109.60	.....	9 36 29	76.98	.....	8, 8	p	400	Hd.	" "	
15	9 33 48	101.80	.....	9 33 44	68.61	.....	8, 8	f	400	Hd.	" "	
16	10 15 43	92.29	.....	10 15 52	86.89	.....	8, 8	g	400	Hd.	" "	

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SATELLITES OF URANUS.

URANUS–ARIEL.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
May 14	13 27 30	253.69	13 27 36	14.83	10, 10	5	600	See	26-inch	A shade fainter than Umbriel but distinct.
15	13 6 36	30.61	13 6 30	14.58	10, 10	4	600	See	" "	
23	12 56 12	94.58	12 56 30	13.92	10, 10	4	600	See	" "	
28	12 15 48	86.46	12 16 0	14.30	10, 10	3	600	See	" "	Well seen in spite of haze.
June 4	12 0 30	355.84	12 0 48	13.29	6, 6	4	600	See	" "	Extremely difficult.
9	10 57 24	359.26	10 57 6	14.34	10, 10	2	600	See	" "	Extremely difficult.
10	11 52 30	144.59	11 52 30	13.95	10, 10	3	600	See	" "	
24	11 28 12	335.26	11 28 30	14.25	10, 10	4	600	See	" "	Ariel quite distinct.
July 5	10 23 42	104.28	10 23 42	14.06	10, 10	2–3	600	See	" "	
9	10 4 0	288.37	10 4 0	13.75	4, 4	2–3	600	See	" "	Satellite very difficult.
10	9 25 0	101.40	9 25 12	14.47	10, 10	2–3	600	See	" "	
15	8 54 48	81.43	8 54 48	13.91	10, 10	4	600	See	" "	Ariel quite bright.
21	8 52 48	214.44	8 52 42	13.87	10, 10	4	600	See	" "	Ariel quite distinct, twice as bright as Umbriel.
Aug. 2	8 48 6	126.62	8 48 30	13.59	10, 10	3	600	See	" "	Ariel quite distinct.
7	8 47 48	135.26	8 48 0	13.62	10, 10	3–4	600	See	" "	Ariel very faint.
8	8 40 30	267.46	8 41 30	13.84	3, 3	2	600	See	" "	Doubtful.
17	8 20 0	128.73	8 21 0	13.90	4, 3	3	600	See	" "	Clouds interrupt; Ariel brighter than Umbriel.
18	8 21 30	262.69	8 23 0	12.73	3, 4	5	600	See	" "	Clouds interrupt.

URANUS–UMBRIEL.

1901										
May 14	13 11 48	159.95	13 11 48	19.83	10, 10	5	600	See	26-inch	Satellites very faint but excellent measures.
15	12 54 18	246.10	12 54 48	19.95	10, 10	4	600	See	" "	Excellent measures.
23	12 44 42	219.65	12 44 30	21.21	10, 10	4	600	See	" "	
28	12 3 54	294.14	12 4 0	20.95	10, 10	3	600	See	" "	Well seen but sky hazy.
June 4	11 51 6	176.00	11 52 0	20.79	10, 10	4	600	See	" "	
9	10 44 0	251.19	10 44 12	21.76	10, 10	2	600	See	" "	Unsteady.
10	11 42 24	343.04	11 42 48	20.53	10, 10	3	600	See	" "	
19	11 43 30	42.54	11 43 48	20.19	10, 10	3	600	See	" "	
24	11 18 6	121.15	11 18 12	21.64	10, 10	4	600	See	" "	
July 9	9 47 24	302.76	9 47 54	21.12	10, 10	2–3	600	See	" "	Satellite very difficult; doubtful if the object is the satellite.
10	9 36 54	58.51	9 37 42	21.10	10, 10	2–3	600	See	" "	
15	9 15 12	96.73	9 12 30	20.59	5, 5	4	600	See	" "	Very difficult but well seen; Ariel twice as bright as Umbriel.
21	9 7 30	283.74	9 7 30	18.91	10, 10	4	600	See	" "	
Aug. 2	8 57 36	288.55	9 2 0	18.98	3, 4	3	600	See	" "	Very difficult but measures fair.
8	8 31 36	59.96	8 32 0	20.30	9, 10	3	600	See	" "	Very difficult.
9	8 46 48	145.89	8 47 12	18.90	10, 10	3	600	See	" "	
18	8 28 30	168.84	8 30 0	19.76	3, 3	5	600	See	" "	Doubtful if object is the satellite.
19	8 10 30	294.25	8 12 30	22.40	3, 4	4	600	See	" "	

URANUS–TITANIA.

1900										
Apr. 25	14 41 24	138.29	14 41 42	32.78	10, 10	2–3	600	See	26-inch	
26	14 8 36	178.54	14 10 12	32.57	10, 10	4	600	See	" "	
May 5	15 36 36	193.62	15 36 30	32.97	10, 10	3–4	600	See	" "	
9	15 7 12	359.01	15 8 0	33.50	10, 10	1–3	600	See	" "	Hazy; satellite difficult.
17	13 47 24	327.01	13 49 0	33.27	10, 10	4	600	See	" "	Clouds interrupt.

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SATELLITES OF URANUS—Continued.

URANUS–TITANIA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1900	h m s	°	h m s	″						
May 20	12 17 0	88.10	12 17 0	33.61	10, 10	3–4	600	See	26-inch	Hazy.
21	13 14 48	131.63	13 14 30	33.29	10, 10	3–4	600	See	" "	
30	11 8 12	140.60	11 9 0	33.30	10, 10	2–4	600	See	" "	
June 1	10 27 30	221.82	10 28 30	33.21	10, 10	2	600	See	" "	Very hazy.
4	11 14 12	347.10	11 15 0	33.64	10, 10	3	600	See	" "	
5	11 36 6	28.83	11 36 30	33.04	10, 10	4	600	See	" "	
6	11 54 30	71.20	11 54 0	33.12	10, 10	4	600	See	" "	
7	11 57 48	113.72	11 58 42	33.60	10, 10	4–5	600	See	" "	
8	11 43 54	153.68	11 44 30	33.12	10, 10	3–4	600	See	" "	
19	9 12 48	244.53	9 13 30	32.74	10, 10	2	600	See	" "	
20	10 25 48	288.02	10 26 0	32.79	10, 10	2	600	See	" "	
23	11 7 12	54.63	11 7 30	33.07	10, 8	3	600	See	" "	
24	10 35 24	94.75	10 36 0	33.22	10, 10	2–3	600	See	" "	Hazy.
30	9 33 0	339.86	9 33 30	33.15	10, 10	2–1	400	See	" "	Very much blurred.
July 1	9 39 30	21.51	9 39 0	32.83	10, 10	3–4	600	See	" "	
2	9 19 48	62.59	9 19 42	32.88	10, 10	3	600	See	" "	
15	9 10 36	240.02	9 10 42	31.91	10, 10	4	600	See	" "	
16	9 12 36	281.03	9 13 0	32.61	10, 10	3	600	See	" "	Hazy.
17	9 19 12	322.00	9 19 30	33.14	10, 10	4	600	See	" "	
27	8 34 6	15.07	8 35 0	32.07	10, 10	4	600	See	" "	
28	8 30 6	56.62	8 30 12	32.63	10, 10	2–3	600	See	" "	Hazy.
30	8 20 36	137.87	8 21 0	32.94	10, 10	3	600	See	" "	
31	8 19 48	179.85	8 19 42	33.05	10, 10	3	600	See	" "	Moonlight; satellite faint.
Aug. 15	7 54 30	80.26	7 54 42	32.41	10, 10	2–3	600	See	" "	
18	7 56 12	202.91	7 55 12	32.01	10, 10	2–3	600	See	" "	Hazy and blurred.
19	7 49 36	246.18	7 50 0	31.45	10, 10	3	600	See	" "	Hazy; satellite very difficult.
25	7 40 18	132.32	7 40 12	32.24	10, 10	5	400	See	" "	
30	7 40 36	340.16	7 40 12	32.18	10, 10	3–4	600	See	" "	
31	7 42 42	19.73	7 39 0	32.18	5, 10	2–3	600	See	" "	Hazy and blurred; satellite very faint.
1901										
Apr. 11	15 14 24	251.86	15 14 42	33.10	10, 10	3	600	See	26-inch	
16	15 18 18	100.06	15 19 12	32.88	10, 10	4–5	600	See	" "	
17	14 23 36	138.38	14 23 30	32.88	10, 9	3–4	600	See	" "	Hazy and blurred.
26	14 9 48	149.92	14 10 0	33.11	10, 10	1–2	600	See	" "	
27	14 9 6	192.06	14 9 48	32.67	10, 10	3	600	See	" "	
28	14 13 12	233.85	14 13 0	32.55	10, 10	4	600	See	" "	
29	13 41 30	273.68	13 43 6	32.92	10, 10	3–4	600	See	" "	
May 13	12 38 0	131.37	12 37 48	33.31	10, 10	3	600	See	" "	Very clear.
14	12 37 48	173.22	12 37 48	33.40	10, 10	4–5	600	See	" "	
15	12 10 36	214.62	12 10 48	32.67	10, 10	4	600	See	" "	
16	12 18 24	254.80	12 19 12	32.94	10, 10	2	600	See	" "	Hazy; clouds interrupt.
17	12 11 30	296.94	12 12 48	33.08	10, 10	3	600	See	" "	Hazy; satellite difficult.
22	12 20 48	142.98	12 21 24	33.40	10, 10	2–3	600	See	" "	Hazy.
23	12 9 48	184.48	12 10 12	33.21	10, 10	4	600	See	" "	
28	11 29 48	30.22	11 29 48	33.36	10, 10	3	600	See	" "	
June 3	10 41 36	276.00	10 41 30	33.02	10, 10	3	600	See	" "	Moonlight; satellite faint.
4	11 15 0	318.85	11 16 6	33.31	10, 10	4	600	See	" "	
9	10 9 24	162.56	10 9 48	33.42	10, 10	2	600	See	" "	Badly blurred.
10	11 12 30	208.00	11 12 48	33.32	10, 10	2–3	600	See	" "	
18	11 7 30	178.33	11 7 36	32.81	10, 10	3–4	600	See	" "	
19	11 4 30	219.55	11 4 42	33.16	10, 10	3–4	600	See	" "	
23	10 52 48	24.96	10 53 18	33.35	10, 10	3	600	See	" "	
24	10 45 0	65.60	10 45 24	33.41	10, 10	4	600	See	" "	
July 5	9 54 6	158.20	9 54 6	32.61	10, 10	2–3	600	See	" "	
9	9 12 42	323.03	9 13 12	33.24	10, 10	3	600	See	" "	Blurred.

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SATELLITES OF URANUS—Continued.

URANUS–TITANIA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	″						
July 10	8 57 48	4.85	8 58 12	32.80	10, 10	2–3	600	See	26-inch	Hazy.
15	8 22 12	210.23	8 22 0	32.57	10, 10	4	600	See	" "	
20	9 11 6	58.46	9 11 42	32.55	10, 10	2–3	600	See	" "	Hazy; seeing not very good.
21	8 21 30	99.18	8 21 30	33.00	10, 10	4	600	See	" "	
23	8 27 48	181.22	8 28 24	32.80	10, 10	4	600	See	" "	Moonlight; satellite very faint.
Aug. 2	8 13 36	234.04	8 14 0	32.28	10, 10	3	600	See	" "	Hazy.
7	8 16 54	80.42	8 17 6	32.78	10, 10	3–4	600	See	" "	
8	8 2 6	123.05	8 2 0	32.55	10, 10	2–3	600	See	" "	
9	7 59 48	162.55	7 59 30	32.45	10, 10	3	600	See	" "	
17	7 56 12	132.54	7 56 24	31.93	10, 10	3	600	See	" "	
18	8 36 12	175.53	8 36 24	31.93	10, 10	5	600	See	" "	
19	7 42 0	215.22	7 42 0	32.19	10, 10	4	600	See	" "	
20	7 40 54	257.59	7 41 12	31.84	10, 10	4–5	600	See	" "	
Sept. 4	7 18 48	157.57	7 19 12	31.17	10, 10	3	600	See	" "	
6	7 20 18	239.90	7 20 18	31.40	10, 10	3	600	See	" "	
1902										
Apr. 30	14 41 15	288.77	14 41 30	32.89	10, 10	2–3	600	See	26-inch	
May 1	14 32 45	330.18	14 33 0	33.21	10, 10	2	600	See	" "	
4	14 29 45	94.03	14 30 0	32.94	10, 10	3	600	See	" "	
5	14 26 52	135.66	.. .. ..	.....	10, ..	3	600	See	" "	Not very clear.
6	14 28 0	177.33	14 28 0	32.95	10, 10	2–1	600	See	" "	Hazy; satellite faint.
8	14 32 12	258.42	14 32 15	32.82	10, 10	2–3	600	See	" "	
9	14 7 0	299.64	14 7 0	32.46	10, 10	2–3	600	See	" "	
11	14 21 54	24.30	14 22 0	33.12	10, 10	3	600	See	" "	Hazy; satellite faint.
15	14 2 24	189.06	14 2 15	32.57	10, 10	4	600	See	" "	
28	13 18 8	4.74	13 18 0	32.73	10, 10	2–3	600	See	" "	
29	13 9 3	46.53	13 9 0	33.89	10, 10	2–3	600	See	" "	
30	13 17 0	88.67	13 17 30	33.70	10, 10	2	600	See	" "	Hazy.
31	13 23 30	127.82	13 23 30	33.53	10, 10	2	600	See	" "	Hazy.
June 1	13 8 0	169.82	13 8 0	32.77	10, 10	5	600	See	" "	
2	13 4 30	211.98	13 7 0	33.05	5, 10	..	600	See	" "	Clouds interrupt.
4	13 6 45	293.36	13 7 15	33.02	10, 10	2	600	See	" "	
5	13 5 0	334.25	13 5 0	33.07	10, 10	2–3	600	See	" "	
7	13 16 30	59.01	13 17 0	33.63	10, 10	2–3	600	See	" "	
8	12 55 0	99.45	12 55 0	33.16	10, 10	3	600	See	" "	
9	12 42 52	141.50	12 43 0	32.81	10, 10	2–1	600	See	" "	Very much blurred.
10	12 37 26	181.38	12 37 30	33.17	10, 10	3–4	600	See	" "	
11	12 37 45	222.49	12 38 0	33.29	10, 10	3	600	See	" "	
17	11 58 30	109.56	11 58 30	33.10	10, 10	2	600	See	" "	
24	11 25 0	40.26	11 25 0	32.56	10, 10	2	600	See	" "	
July 2	10 19 8	41.23	10 20 0	32.25	10, 10	2	600	D.	" "	
11	9 47 30	18.75	9 47 45	32.70	10, 10	4	600	See	" "	
12	9 52 0	60.94	9 52 0	33.30	10, 10	2–3	600	See	" "	Hazy; a faint star close to Titania
13	9 53 45	101.53	9 54 0	33.31	10, 10	3	600	See	" "	makes measures difficult and uncertain.
14	9 46 30	140.56	9 46 45	33.06	10, 10	3	600	See	" "	
22	9 26 0	111.83	9 26 0	33.04	10, 10	2	600	See	" "	Hazy and blurred.
31	8 19 0	123.83	8 19 .0	32.58	10, 10	4–5	600	See	" "	Quite steady.
Aug. 2	8 16 15	205.64	8 16 0	32.25	10, 10	2–3	400	See	" "	
3	8 30 15	246.29	8 30 0	32.52	10, 10	2–3	600	See	" "	Hazy.
4	8 12 30	286.86	8 12 30	32.85	10, 10	1–2	600	See	" "	Unsteady and very much blurred.
7	8 2 30	51.91	8 2 45	32.96	10, 10	2	600	See	" "	Unsteady and blurred.
8	8 17 30	94.81	8 17 45	32.71	10, 10	2–3	600	See	" "	Not very good measures.
20	8 22 38	229.72	8 23 0	32.11	10, 10	2	600	See	" "	Hazy; satellite difficult.
21	7 37 0	269.88	7 37 0	32.21	10, 10	2–3	600	See	" "	
22	7 54 22	310.75	7 54 0	32.53	10, 10	2–3	600	See	" "	Hazy and blurred.
23	7 52 15	353.62	7 54 0	32.41	5, 10	2–3	600	See	" "	Hazy but still; clouds interrupt.

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SATELLITES OF URANUS—Continued.

URANUS–TITANIA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
Aug. 24	7 35 0	32.78	7 35 0	31.89	10, 10	2–3	600	See	26-inch	
25	8 3 52	74.83	8 4 0	32.00	10, 10	2	600	See	" "	Hazy.
28	7 35 30	201.52	7 35 15	31.93	10, 10	2–3	600	See	" "	Hazy.
30	7 31 22	284.29	7 31 45	32.20	10, 10	3	600	See	" "	
31	7 31 0	321.58	7 31 0	31.96	10, 10	2–3	600	See	" "	Hazy.
Sept. 1	7 31 0	7.21	7 31 0	32.06	10, 10	2–3	600	See	" "	Unsteady and blurred.
1903										
Apr. 28	15 33 16	181.78	15 34 6	30.48	10, 10	..	600	D.	26-inch	Fuzzy; micrometer changed one rev.
29	15 46 6	219.86	15 46 51	30.99	10, 10	g	600	D.	" "	
May 28	14 4 2	337.33	14 2 53	32.34	9, 10	p	600	D.	" "	Satellite extremely faint.
June 3	13 0 13	228.58	13 2 18	31.60	8, 8	p	600	D.	" "	
20	12 7 0	204.69	12 7 27	32.78	8, 8	b	600	D.	" "	
21	11 52 22	246.66	11 52 57	33.07	8, 8	f	600	D.	" "	
30	10 58 28	256.26	10 58 24	32.70	8, 8	g	600	D.	" "	
July 19	9 43 20	320.36	9 43 3	31.83	8, 8	f	600	D.	" "	
21	9 13 59	43.62	9 14 43	32.45	8, 8	p	600	D.	" "	
24	9 2 49	166.74	9 3 19	31.59	8, 8	p	600	D.	" "	Satellite very difficult.
1904										
May 24	14 39 31	186.52	14 40 40	32.60	8, 8	p	400	Fk.	26-inch	
June 3	12 20 24	235.28	12 19 35	32.13	8, 8	p	400	Fk.	" "	
8	14 1 13	85.46	14 1 30	32.74	8, 8	p	400	Fk.	" "	
13	12 47 17	290.05	12 47 55	32.29	8, 8	f	400	Fk.	" "	
14	13 7 17	333.49	13 6 52	32.20	8, 8	f	400	Fk.	" "	
15	12 55 20	14.39	12 55 21	33.09	8, 8	f	400	Fk.	" "	
17	12 46 10	94.95	12 45 31	32.49	8, 8	g	400	Fk.	" "	
22	12 38 18	301.85	12 38 24	32.26	8, 8	b	400	Fk.	" "	
23	12 34 42	344.92	12 34 8	32.32	8, 8	b	400	Fk.	" "	
July 3	11 35 43	35.92	11 35 10	32.84	8, 8	b	400	Fk.	" "	
4	11 14 18	75.23	11 13 55	33.09	8, 8	b	400	Fk.	" "	
11	10 43 18	6.49	10 43 2	32.51	8, 8	p	400	Fk.	" "	
13	10 29 35	87.02	10 28 59	32.69	9, 8	p	400	Fk.	" "	
20	9 58 22	16.00	9 59 48	33.23	8, 8	b	400	Hd.	" "	
31	9 47 44	109.95	9 48 31	32.23	8, 8	p	400	Hd.	" "	
Aug. 2	8 40 36	192.08	8 46 37	32.55	4, 4	f	400	Hd.	" "	Clouds interrupt; satellite faint.
3	8 26 17	232.81	8 27 2	32.22	8, 8	g	400	Hd.	" "	
12	8 19 56	243.84	8 20 40	32.19	8, 8	f	400	Hd.	" "	
28	7 52 21	185.18	7 51 18	31.08	8, 8	p	400	Hd.	" "	
Sept. 4	7 40 11	113.67	7 41 2	31.02	8, 8	g	400	Hd.	" "	
1905										
June 1	11 46 4	124.41	11 46 24	31.14	8, 9	p	400	R.	26-inch	Seeing variable.
3	12 29 7	205.39	12 39 22	32.30	4, 5	f	400	R.	" "	Satellite very faint.
28	12 11 54	162.97	12 20 47	33.18	5, 6	f	400	R.	" "	
30	11 50 16	242.56	12 0 21	32.65	5, 6	g	400	R.	" "	Good measures.
July 7	10 52 38	172.59	10 58 51	31.98	4, 5	g	400	R.	" "	Good measures.
25	10 57 26	197.91	11 5 35	32.73	4, 6	f	400	R.	" "	
26	10 59 0	235.84	11 24 29	32.60	4, 6	f	400	R.	" "	
1906										
June 25	13 10 21	11.15	13 10 37	32.28	6, 5	..	400	R.	26-inch	Seeing steady but not very clear; fair measures.
July 13	11 45 31	31.39	11 45 16	32.57	6, 5	g	400	R.	" "	
19	10 35 27	278.24	10 36 18	30.62	6, 6	g	400	R.	" "	Seeing good at intervals.
1907										
May 11	15 35 28	283.76	15 35 0	28.71	8, 8	f	400	Fn.	26-inch	
12	15 27 18	330.10	15 27 18	31.02	8, 8	f	400	Fn.	" "	
13	15 31 17	8.93	15 30 50	32.38	8, 8	g	400	Fn.	" "	
14	15 12 12	45.65	15 11 50	31.31	8, 8	g	400	Fn.	" "	
20	15 20 33	298.30	15 21 46	29.31	8, 8	f	400	Fn.	" "	

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SATELLITES OF URANUS—Continued.

URANUS–TITANIA—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	h m s	″						
May 21	15 3 23	340.85	15 4 35	31.92	8, 8	f	400	Fn.	26-inch	
June 6	13 47 31	274.67	13 46 49	29.30	8, 8	p	400	Fn.	" "	Hazy; satellite visible at intervals.
8	13 13 56	0.43	13 13 59	31.91	8, 8	b	400	Fn.	" "	Blurred, unsteady and diffuse.
15	12 55 25	288.66	12 55 10	28.83	8, 8	f	400	Fn.	" "	Unsteady.
16	12 51 25	332.77	12 51 31	31.37	8, 8	g	400	Fn.	" "	
17	14 6 29	13.54	14 6 45	33.18	8, 8	f	400	Fn.	" "	Sky thick.
19	14 12 45	94.18	14 12 58	29.51	8, 8	f	400	Fn.	" "	
30	12 35 12	8.91	12 35 5	32.69	8, 8	f	400	Fn.	" "	
July 3	11 42 42	313.30	11 42 41	30.27	8, 8	f	400	Fn.	" "	
4	12 38 45	356.37	12 38 54	32.68	8, 8	p	400	Fn.	" "	
14	12 57 10	45.78	12 56 50	31.61	8, 8	p	400	Fn.	" "	
16	11 26 28	130.34	11 27 13	30.17	8, 8	f	400	Fn.	" "	
27	9 17 54	218.58	9 18 12	32.11	8, 8	p	400	Fn.	" "	
30	9 31 11	346.24	9 30 58	31.38	8, 8	p	400	Fn.	" "	
31	9 12 46	24.49	9 12 17	32.15	8, 8	g	400	Fn.	" "	
Aug. 7	11 37 42	321.82	11 49 39	30.62	4, 8	p	400	Fn.	" "	
11	9 35 26	121.33	9 36 21	29.46	8, 8	f	400	Fn.	" "	
12	9 9 28	163.79	9 9 10	31.46	8, 8	e	400	Fn.	" "	

URANUS–OBERON.

1900										
Apr. 25	15 8 30	140.03	15 8 48	45.80	10, 10	2–3	600	See	26-inch	
26	14 32 42	166.40	14 34 12	44.71	10, 10	4	600	See	" "	
May 5	15 10 24	47.98	15 11 0	44.42	10, 10	3–4	600	See	" "	
9	15 30 42	155.43	15 30 42	44.69	10, 10	1–3	600	See	" "	Moist and hazy.
17	13 23 48	6.58	13 24 0	43.88	10, 10	4	600	See	" "	Satellite quite plain.
20	12 31 48	86.03	12 32 0	44.93	10, 10	2–3	600	See	" "	Hazy.
21	13 27 30	114.50	13 28 0	44.79	10, 10	3–4	600	See	" "	
30	11 25 48	351.81	11 26 30	44.84	10, 10	2–3	600	See	" "	Hazy.
June 1	10 41 0	45.28	10 41 0	44.92	10, 10	1–2	600	See	" "	Very hazy; satellite very difficult.
4	11 30 12	126.59	11 30 30	45.31	10, 10	3–4	600	See	" "	
5	11 47 48	153.40	11 48 12	44.63	10, 10	4	600	See	" "	
6	12 2 12	180.23	12 2 30	44.49	10, 10	4	600	See	" "	
7	12 9 0	207.51	12 9 0	44.12	10, 10	4–5	600	See	" "	
8	12 1 6	233.22	12 1 12	43.45	10, 10	2–3	600	See	" "	Hazy.
19	9 29 30	165.16	9 28 48	44.37	10, 10	2	600	See	" "	
20	10 37 24	192.59	10 37 12	44.12	10, 10	2–3	600	See	" "	
23	11 15 30	274.46	11 15 48	44.36	10, 10	3	600	See	" "	
30	9 47 24	100.48	9 48 0	44.72	10, 10	2–1	400	See	" "	Very much blurred.
July 1	9 56 12	127.27	9 57 0	44.44	10, 11	3–4	600	See	" "	
2	9 32 24	153.12	9 32 30	44.81	10, 10	3	600	See	" "	
15	9 21 48	140.81	9 22 12	44.60	10, 10	4	600	See	" "	
16	9 27 0	167.09	9 27 12	43.66	10, 10	3	600	See	" "	Hazy.
17	9 29 30	194.76	9 29 48	43.79	10, 10	4	600	See	" "	
27	8 46 48	101.36	8 47 0	43.90	10, 10	3–4	600	See	" "	
28	8 42 0	127.96	8 42 12	44.17	10, 10	2–3	600	See	" "	Hazy.
30	8 35 0	180.93	8 35 0	43.50	10, 12	3	600	See	" "	Clouds interrupt.
31	8 29 24	207.55	8 29 0	43.40	10, 10	3–4	600	See	" "	
Aug. 15	8 4 12	247.74	8 5 0	42.62	10, 10	2	600	See	" "	Blurred.
18	8 8 24	327.01	8 8 42	42.71	10, 10		600	See	" "	Hazy and blurred.
19	8 0 42	354.98	8 1 0	43.08		2–3	600	See	" "	
					10, 10	3				
25	7 48 48	156.54	7 48 42	42.95	10, 10	5	400	See	" "	
30	7 51 0	288.83	7 51 42	41.49	10, 10	3–4	600	See	" "	
31	7 50 36	314.27	7 51 0	42.25	10, 10	2–3	600	See	" "	

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SATELLITES OF URANUS—Continued.

URANUS–OBERON—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
Apr. 11	15 38 6	165.05	15 38 6	43.21	10, 10	3	600	See	26-inch	Oberon a little fainter than Titania.
16	15 45 0	297.45	15 45 0	43.66	10, 10	4–5	600	See	" "	
17	14 52 30	326.02	14 57 48	45.87	5, 2	3–4	600	See	" "	Clouds interrupt.
26	14 34 0	204.78	14 34 0	43.93	10, 10	1–2	600	See	" "	Very much blurred; times somewhat uncertain.
27	14 40 12	232.14	14 40 54	43.80	10, 10	3	600	See	" "	
28	14 40 0	258.37	14 40 12	43.97	10, 10	4	600	See	" "	Ariel seen distinctly, but very difficult.
29	14 9 18	283.54	14 10 0	44.06	10, 10	3–4	600	See	" "	
May 13	12 59 12	297.64	12 59 12	43.92	10, 10	3	600	See	" "	Ariel and Umbriel seen, but too faint to measure.
14	13 0 48	324.28	13 0 12	44.02	10, 10	5	600	See	" "	
15	12 35 42	351.08	12 35 36	44.31	10, 10	4	600	See	" "	
16	12 40 12	17.59	12 40 12	44.31	10, 10	3	600	See	" "	
22	12 43 18	178.99	12 42 48	44.26	10, 10	2–3	600	See	" "	Hazy and moist.
23	12 29 24	205.33	12 29 12	44.70	10, 10	4	600	See	" "	
28	11 49 18	337.53	11 49 30	44.26	10, 10	3	600	See	" "	
June 3	10 54 30	137.27	10 55 0	44.20	10, 10	3	600	See	" "	
4	11 33 12	164.83	11 32 48	43.78	10, 10	4	600	See	" "	
9	10 30 12	295.25	10 30 12	44.24	10, 10	2	600	See	" "	
10	11 30 0	325.58	11 30 6	44.47	10, 10	3	600	See	" "	
18	11 23 42	178.81	11 23 48	44.57	10, 10	3–4	600	See	" "	
19	11 23 42	206.15	11 23 36	44.22	10, 10	3–4	600	See	" "	
23	11 10 6	311.65	11 10 6	44.80	10, 10	3	600	See	" "	
24	11 1 42	338.94	11 1 42	44.32	10, 10	4	600	See	" "	
July 5	10 11 42	272.35	10 11 42	44.02	10, 10	2–3	600	See	" "	
9	9 32 48	19.53	9 33 0	43.68	10, 10	2–3	600	See	" "	
10	9 14 36	46.65	9 14 42	43.24	10, 10	2–3	600	See	" "	
15	8 40 24	177.85	8 40 36	43.87	10, 10	4	600	See	" "	
20	9 28 0	312.31	9 28 0	44.33	10, 10	2–3	600	See	" "	
21	8 40 0	338.85	8 40 0	44.21	10, 10	4	600	See	" "	
23	8 49 6	32.54	8 49 12	44.03	10, 10	2	600	See	" "	
Aug. 2	8 29 42	299.93	8 29 42	43.37	10, 10	3	600	See	" "	
7	8 31 42	74.33	8 31 30	43.80	10, 10	3–4	600	See	" "	
8	8 19 30	99.63	8 19 48	43.74	10, 10	2	600	See	" "	
9	8 17 12	126.32	8 17 30	43.70	10, 10	3	600	See	" "	
17	8 11 12	338.94	8 11 18	42.44	10, 10	3	600	See	" "	
18	8 47 54	7.76	8 48 0	43.62	10, 10	4	600	See	" "	Sky clouded over.
19	7 56 48	34.16	7 57 6	42.27	10, 10	4	600	See	" "	
20	7 56 36	61.20	7 56 54	42.87	10, 10	4	600	See	" "	
Sept. 4	7 37 48	101.41	7 38 0	42.24	10, 10	3	600	See	" "	Ariel suspected, but too faint to measure.
6	7 38 30	154.17	7 38 42	42.46	10, 10	3	600	See	" "	Ariel and Umbriel seen, but too faint to measure.
1902										
Apr. 30	15 1 15	351.07	15 1 24	43.49	10, 10	2–3	600	See	26-inch	
May 1	14 53 45	17.76	14 53 40	43.23	10, 10	2–3	600	See	" "	
4	14 45 15	96.81	14 45 0	44.23	10, 10	2–1	600	See	" "	
5	14 41 50	123.35	14 41 30	44.39	10, 10	3	600	See	" "	
6	14 50 0	151.72	14 50 0	44.77	10, 10	2–1	600	See	" "	Hazy.
8	14 12 45	203.62	14 12 45	43.80	10, 10	2–3	600	See	" "	
9	14 25 30	230.30	14 25 45	44.15	10, 10	2–3	600	See	" "	
15	14 25 45	32.52	14 25 30	43.24	10, 10	3	600	See	" "	Hazy.
28	13 33 30	17.91	13 33 30	44.04	10, 10	2–3	600	See	" "	
29	13 25 48	46.24	13 26 9	44.56	10, 10	2–3	600	See	" "	
30	13 39 45	72.26	13 40 0	44.51	10, 10	2	600	See	" "	Hazy.
June 1	13 25 8	124.43	13 25 15	44.06	10, 10	5	600	See	" "	
4	13 24 30	205.35	13 24 30	44.61	10, 10	2	600	See	" "	Unsteady and blurred.

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SATELLITES OF URANUS—Continued.

URANUS–OBERON—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	″						
June 5	13 23 45	232.75	13 24 0	44.58	10, 10	2–3	600	See	26-inch	
7	13 29 30	285.18	13 30 0	44.46	10, 10	2–3	600	See	" "	Blurred.
8	13 11 0	310.96	13 11 0	44.41	10, 10	3	600	See	" "	
9	12 59 0	338.41	12 59 0	44.43	10, 10	1–2	600	See	" "	Badly blurred.
10	12 55 30	4.44	12 55 30	44.43	10, 10	3–4	600	See	" "	
11	12 53 8	32.04	12 53 15	44.70	10, 10	3	600	See	" "	
24	11 35 38	18.10	11 36 0	44.17	10, 10	2	600	See	" "	
July 2	10 57 38	231.02	10 58 30	44.35	10, 10	1	600	D.	" "	
11	10 3 40	110.24	10 3 45	44.13	10, 10	3	600	See	" "	
12	10 12 30	136.37	10 12 0	43.59	10, 10	2–3	600	See	" "	Hazy.
13	10 11 45	164.70	10 12 30	43.96	10, 10	3	600	See	" "	Hazy; satellites difficult.
14	10 1 15	190.61	10 1 0	43.70	10, 10	3	600	See	" "	Hazy and moonlight; satellites faint.
22	9 43 0	45.93	9 43 0	43.72	10, 10	2	600	See	" "	Moonlight, hazy and unsteady.
31	8 46 15	284.01	8 47 0	43.78	10, 10	4	600	See	" "	Hazy.
Aug. 2	8 31 30	337.60	8 31 30	43.39	10, 10	2–3	600	See	" "	Hazy, with thin clouds.
3	8 47 0	5.49	8 47 0	43.41	10, 10	2–3	600	See	" "	Hazy.
4	8 28 22	31.86	8 28 30	44.22	10, 10	2	600	See	" "	
7	8 16 15	111.52	8 16 0	43.58	10, 10	2	600	See	" "	Unsteady.
8	8 33 30	138.64	8 33 30	43.47	10, 10	2–3	600	See	" "	Hazy and unsteady.
21	7 51 0	125.71	7 51 0	43.71	10, 10	3	600	See	" "	
22	8 7 0	153.47	8 7 0	42.26	10, 10	2–3	600	See	" "	Hazy and unsteady.
23	8 10 0	178.93	8 10 0	42.37	10, 10	2–3	600	See	" "	
24	7 49 0	205.62	7 49 0	42.83	10, 10	2–3	600	See	" "	
25	8 16 30	232.52	8 16 45	42.35	10, 10	2	600	See	" "	Hazy; satellite difficult.
28	7 51 30	309.87	7 51 30	41.92	10, 10	2–3	600	See	" "	Hazy.
30	7 49 48	5.55	7 50 0	41.95	10, 10	2–3	600	See	" "	Hazy.
31	7 45 22	32.51	7 45 15	44.48	10, 10	2–3	600	See	" "	Hazy and unsteady.
Sept. 1	7 47 52	58.54	7 47 45	42.64	10, 10	2–3	600	See	" "	Blurred.
1903										
June 3	13 46 38	216.96	13 48 12	45.33	8, 8	p	600	D.	26-inch	Satellite very difficult.
20	12 40 26	308.16	12 40 56	43.26	9, 8	p	600	D.	" "	
21	12 24 58	337.19	12 25 29	43.05	8, 8	p	600	D.	" "	
30	11 34 43	215.31	11 36 55	43.52	8, 8	f	600	D.	" "	
July 21	9 43 52	57.92	9 44 42	42.75	8, 8	p	600	D.	" "	
24	9 32 32	136.11	9 33 6	43.87	8, 8	p	600	D.	" "	
1906										
June 25	13 36 47	224.87	13 36 6	42.96	6, 5	..	400	R.	26-inch	Oberon very faint and small star very near.
July 13	12 11 51	348.61	12 12 41	43.31	6, 5	..	400	R.	" "	Unsteady and diffuse at intervals.
19	10 51 7	147.70	10 51 9	41.83	6, 6	g	400	R.	" "	

TITANIA–OBERON.

1901										
Apr. 11	15 26 24	126.85	15 26 6	53.67	10, 10	3	600	See	26-inch	
16	15 33 36	290.23	15 33 24	75.59	10, 10	4–5	600	See	" "	
17	14 39 30	321.81	14 40 0	76.86	10, 10	3–4	600	See	" "	Clouds.
26	14 21 48	251.92	14 22 0	35.55	10, 10	1–2	600	See	" "	
27	14 25 24	279.09	14 26 24	27.74	10, 10	3	600	See	" "	
28	14 27 30	301.74	14 28 0	19.81	10, 10	4	600	See	" "	
29	13 56 0	308.03	13 56 0	13.63	10, 10	3–4	600	See	" "	
May 13	12 50 24	303.05	12 49 42	77.45	10, 10	3	600	See	" "	
14	12 49 12	336.03	12 49 24	75.12	10, 10	5	600	See	" "	
15	12 24 6	8.60	12 24 36	71.80	10, 10	4	600	See	" "	
16	12 29 6	41.67	12 29 24	68.09	10, 10	3	600	See	" "	Hazy; clouds interrupt.
17	12 19 48	73.43	12 23 0	62.24	5, 4	3	600	See	" "	Hazy; clouds interrupt.
22	12 32 12	226.45	12 32 0	25.28	10, 10	2–3	600	See	" "	

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SATELLITES OF URANUS—Continued.

TITANIA-OBERON—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m s	°	h m s	"						
May 23	12 19 12	245.16	12 19 30	17.07	10, 10	4	600	See	26-inch	
28	11 40 0	289.75	11 40 0	36.23	10, 10	3	600	See	" "	
June 4	11 24 24	153.55	11 24 24	75.69	10, 10	4	600	See	" "	
9	10 20 12	316.84	10 19 48	72.13	10, 10	2	600	See	" "	Unsteady and blurred.
10	11 21 30	351.07	11 21 30	61.61	10, 10	2–3	600	See	" "	
18	11 15 24	180.61	11 15 12	11.61	10, 10	3–4	600	See	" "	
19	11 14 48	173.81	11 14 48	14.91	10, 10	3–4	600	See	" "	
23	11 1 18	269.13	11 1 30	47.10	10, 10	3	600	See	" "	
24	10 53 12	301.22	10 53 0	54.17	10, 10	4	600	See	" "	
July 5	10 3 24	300.28	10 3 30	64.83	10, 10	2–3	600	See	" "	
9	9 23 0	66.03	9 23 0	37.11	10, 10	2	600	See	" "	Hazy; unsteady.
10	9 5 54	94.00	9 6 18	28.75	10, 10	2–3	600	See	" "	
15	8 32 6	131.42	8 32 6	24.53	10, 10	4	600	See	" "	
20	9 19 42	281.81	9 19 48	61.73	10, 10	2–3	600	See	" "	
21	8 29 48	313.30	8 29 54	67.38	10, 10	4	600	See	" "	
23	8 39 42	19.53	8 39 48	74.07	10, 10	3	600	See	" "	
Aug. 2	8 22 18	344.18	8 22 18	41.84	10, 10	3	600	See	" "	
7	8 23 36	51.40	8 23 42	12.63	10, 10	3–4	600	See	" "	
8	8 11 12	58.76	8 11 30	18.81	10, 10	2–1	600	See	" "	
9	8 8 42	77.54	8 9 0	26.20	10, 10	3	600	See	" "	
17	8 3 24	328.96	8 3 30	74.26	10, 10	3	600	See	" "	
18	8 41 48	2.70	8 42 0	74.65	10, 10	5	600	See	" "	
19	7 49 48	34.98	7 49 54	73.43	10, 10	4	600	See	" "	
20	7 48 54	67.82	7 48 48	73.56	10, 10	4	600	See	" "	
Sept. 4	7 28 48	54.08	7 28 48	35.73	10, 10	3	600	See	" "	
6	7 30 0	115.63	7 30 18	50.53	10, 10	3	600	See	" "	
1902										
Apr. 30	14 52 12	36.76	14 52 33	39.88	10, 10	2–3	600	See	26-inch	
May 1	14 43 27	64.90	14 43 30	31.01	10, 10	2	600	See	" "	
4	14 37 15	99.94	14 38 0	10.99	10, 10	2	600	See	" "	
5	14 34 30	93.67	14 34 15	14.52	10, 10	3	600	See	" "	
6	14 42 22	97.77	14 42 0	20.66	10, 10	2	600	See	" "	
8	14 23 40	156.42	14 23 30	37.23	10, 10	2–3	600	See	" "	
9	14 16 0	187.43	14 16 30	44.81	10, 10	2–3	600	See	" "	
11	14 35 42	250.78	14 35 0	59.94	10, 10	2	600	See	" "	Blurred; clouds; satellites faint.
15	14 14 7	21.48	14 16 0	76.70	10, 10	3	600	See	" "	Hazy.
28	13 26 36	46.89	13 27 0	14.27	10, 10	2–3	600	See	" "	
29	13 17 0	42.32	13 17 0	11.34	10, 10	2–3	600	See	" "	
30	13 28 30	29.68	13 28 30	17.44	10, 10	2	600	See	" "	
June 1	13 17 30	256.06	13 17 30	31.77	10, 10	5	600	See	" "	
4	13 15 54	167.88	13 16 30	54.38	10, 10	2	600	See	" "	
5	13 14 30	200.98	13 14 30	60.70	10, 10	2–3	600	See	" "	
7	13 23 45	265.82	13 23 30	72.30	10, 10	2–3	600	See	" "	
8	13 2 30	297.72	13 2 15	74.89	10, 10	3	600	See	" "	
9	12 50 52	330.99	12 51 0	76.20	10, 10	1–2	600	See	" "	Badly blurred.
10	12 48 15	3.76	12 48 15	77.16	10, 10	3–4	600	See	" "	
11	12 46 22	216.80	12 46 15	77.38	10, 10	3	600	See	" "	
24	11 30 0	335.97	11 30 0	18.24	10, 10	2	600	See	" "	
July 2	10 38 45	228.36	10 39 30	77.16	10, 10	1	600	D.	" "	
11	9 55 55	146.55	9 55 30	55.98	10, 10	4	600	See	" "	
12	10 1 30	180.40	10 1 0	48.00	10, 10	2–3	600	See	" "	
13	10 2 30	210.70	10 2 30	41.59	10, 10	3	600	See	" "	
14	9 54 46	239.51	9 55 0	32.23	10, 10	3	600	See	" "	
22	9 34 30	2.16	9 34 30	44.66	10, 10	2	600	See	" "	
31	8 37 30	292.62	8 37 30	75.40	10, 10	4–5	600	See	" "	

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SATELLITES OF URANUS—Continued.

TITANIA-OBERON—Continued.

DATE	WASHINGTON MEAN TIME	POSITION ANGLE	WASHINGTON MEAN TIME	DISTANCE	NUMBER OF MEASURES	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1902	h m s	°	h m s	"						
Aug. 2	8 23 45	357 20	8 24 0	69 12	10, 10	2–3	400	See	26-inch	
3	8 39 0	31 60	8 39 0	64. 97	10, 10	2–3	600	See	" "	
4	8 20 30	62 97	8 21 0	59 69	10, 10	2	600	See	" "	Hazy and unsteady.
7	8 9 0	157 76	8 9 0	38 76	10, 10	2	600	See	" "	Unsteady.
8	8 25 30	187 29	8 25 30	29 46	10, 10	2–3	600	See	" "	
21	7 44 0	110 96	7 44 0	72. 04	10, 10	2–3	600	See	" "	
22	8 0 22	143 64	8 0 0	72. 74	10, 10	2–3	600	See	" "	Hazy; blurred.
23	8 3 0	177 09	8 3 0	74 52	10, 10	2–3	600	See	" "	Hazy.
24	7 42 0	210 38	7 42 0	73. 94	10, 10	2–3	600	See	" "	
25	8 11 0	243. 10	8 11 0	72. 82	10, 10	2	600	See	" "	
28	7 43 15	339. 85	7 43 30	62. 17	10, 10	2–3	600	See	" "	Hazy.
30	7 44 30	44. 56	7 45 0	49. 57	10, 10	3	600	See	" "	
31	7 38 22	77. 13	7 38 30	43. 41	10, 10	2–3	600	See	" "	Hazy.
Sept. 1	7 41 0	104. 19	7 41 0	35. 12	10, 10	2–3	600	See	" "	Blurred; unsteady.
1903										
Apr. 28	15 54 24	345. 97	15 54 47	73. 36	10, 10	..	600	D.	26-inch	
29	15 57 17	17. 58	16 3 43	70. 89	5, 10	g	600	D.	" "	
May 28	14 30 34	96. 68	14 30 54	49. 07	10, 10	p	600	D.	" "	
June 3	13 23 56	192. 88	13 24 30	11. 41	8, 8	p	600	D.	" "	
20	12 22 57	341. 32	12 22 58	60. 70	8, 8	p	600	D.	" "	
21	12 8 15	13. 98	12 8 8	55. 12	8, 8	f	600	D.	" "	
30	11 15 8	168. 82	11 15 23	28. 59	8, 8	g	600	D.	" "	
July 19	9 59 34	51. 71	9 59 34	29. 66	7, 8	f	600	D.	" "	
21	9 29 53	86. 45	9 30 6	14. 22	8, 8	p	600	D.	" "	
24	9 18 11	89. 02	9 19 10	22. 17	8, 8	p	600	D.	" "	
1904										
June 3	12 49 28	329. 86	12 49 42	29. 84	9, 8	p	400	Fk.	26-inch	
13	13 10 56	157. 07	13 10 30	58. 25	8, 8	f	400	Fk.	" "	
14	13 32 29	190. 19	13 32 14	65. 39	8, 8	f	400	Fk.	" "	
15	13 23 55	222. 18	13 23 4	70. 27	8, 8	f	400	Fk.	" "	
17	13 8 14	286. 60	13 8 0	74. 07	8, 8	g	400	Fk.	" "	
22	13 3 55	91. 11	13 3 38	67. 38	8, 8	p	400	Fk.	" "	
July 3	12 2 25	314. 52	12 2 2	24. 02	8, 8	b	400	Fk.	" "	
11	11 14 12	203. 65	11 14 23	74. 30	8, 8	f	400	Fk.	" "	
13	10 44 40	267. 85	11 44 55	75. 64	8, 8	p	400	Fk.	" "	
20	10 15 43	136. 30	10 15 26	48. 04	8, 8	p	400	Hd.	" "	
31	10 14 40	350. 40	10 15 2	50. 13	7, 8	p	400	Hd.	" "	
Aug. 3	8 38 19	84. 13	8 38 45	66 21	8, 8	g	400	Hd.	" "	
12	8 34 50	20. 88	8 35 10	60 17	8, 8	f	400	Hd.	" "	
28	8 10 55	35. 19	8 10 49	67. 96	8, 8	p	400	Hd.	" "	
Sept. 4	7 53 6	264. 30	7 53 40	65 93	8, 8	g	400	Hd.	" "	
1905										
June 1	12 2 48	280. 25	12 9 53	70 51	4, 5	p	400	R.	26-inch.	Seeing variable.
3	13 0 41	349. 36	13 17 33	63. 37	4, 7	f	400	R.	" "	
28	12 30 42	298. 34	12 40 54	58 70	4, 6	f	400	R.	" "	
30	12 12 5	3. 55	12 24 40	48. 57	5, 5	g	400	R.	" "	
July 7	11 9 8	101. 89	11 19 54	19. 41	6, 6	g	400	R.	" "	
25	11 14 11	311. 58	11 24 52	43. 39	4, 6	f	400	R.	" "	
26	11 34 6	344. 00	11 42 7	37. 02	5, 6	f	400	R.	" "	
1907										
May 11	15 1 54	128. 88	15 1 47	63. 06	8, 8	f	400	Fn.	26-inch	
12	14 57 45	162. 36	14 58 20	70. 91	8, 8	f	400	Fn.	" "	
13	14 45 24	192. 10	14 45 6	75. 37	8, 8	g	400	Fn.	" "	
14	14 41 55	221. 81	14 42 16	72. 73	8, 8	g	400	Fn.	" "	
20	14 43 5	58. 60	14 43 56	49. 32	8, 8	f	400	Fn.	" "	

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SATELLITES OF URANUS—Continued.

TITANIA–OBERON—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907	h m s	°	h m s	″						
May 21	14 33 53	90.96	14 34 48	40.47	8, 8	f	400	Fn.	26-inch	Satellite difficult.
June 6	13 5 40	107.46	13 5 50	67.36	8, 8	e	400	Fn.	" "	
8	12 39 43	175.55	12 39 0	75.34	8, 8	b	400	Fn.	" "	Blurred; satellites invisible much of the time.
15	12 23 48	219.13	12 24 20	43.20	8, 8	f	400	Fn.	" "	Diffuse.
16	12 21 12	68.12	12 21 2	33.79	8, 8	g	400	Fn.	" "	
17	13 35 23	100.09	13 35 45	24.44	8, 8	f	400	Fn.	" "	Satellites exceedingly faint.
19	13 51 44	132.72	13 51 25	10.62	8, 8	f	400	Fn.	" "	Observation difficult.
30	12 12 16	204.12	12 12 18	72.84	8, 8	f	400	Fn.	" "	Unsteady.
July 3	11 1 48	123.49	11 1 50	69.11	8, 8	f	400	Fn.	" "	
4	12 26 47	160.02	12 26 40	71.08	8, 8	p	400	Fn.	" "	
14	11 42 36	63.03	11 42 12	11.02	8, 8	f	400	Fn.	" "	
16	11 10 12	57.74	11 10 49	18.14	8, 8	f	400	Fn.	" "	
27	9 0 54	35.76	9 0 39	75.06	8, 8	f	400	Fn.	" "	
30	9 15 7	139.24	9 15 2	64.60	8, 8	g	400	Fn.	" "	Satellites faint.
31	8 56 21	171.34	8 56 56	64.35	8, 8	g	400	Fn.	" "	
Aug. 7	11 14 57	9.03	11 15 8	14.32	8, 8	f	400	Fn.	" "	
11	9 7 12	28.76	9 6 31	28.81	8, 8	e	400	Fn.	" "	
12	8 50 59	53.17	8 50 40	35.25	8, 8	e	400	Fn.	" "	

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SATELLITE OF NEPTUNE.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1894	h m s	°	h m s	″						
Dec. 5	10 44 12	75.41	10 45 0	16.18	8, 6	..	600	Br.	26-inch	
6	9 52 12	38.38	9 52 30	14.38	8, 8	3–2	600	Br.	" "	
14	9 48 12	249.22	9 49 0	17.24	8, 8	3	600	Br.	" "	
17	9 28 0	68.22	9 28 12	16.60	8, 8	2	600	Br.	" "	
22	9 51 24	109.62	9 56 0	11.96	8, 4	2	600	Br.	" "	
1895										
Jan. 1	8 12 0	239.40	8 11 30	16.96	8, 6	3	600	Br.	26-inch	
11	7 48 12	351.73	7 49 0	10.11	8, 6	2	600	Br.	" "	
22	8 28 0	41.73	8 28 30	14.77	8, 8	4	600	Br.	" "	
23	8 16 12	324.13	8 16 0	9.94	7, 8	2–3	600	Br.	" "	Unsteady and diffuse; satellite faint.
24	8 4 30	257.51	8 5 0	16.04	8, 8	4	600	Br.	" "	
Mar. 6	7 39 12	263.22	7 41 0	14.31	7, 6	2	600	Br.	" "	Satellite faint and difficult.
9	7 17 0	82.89	7 18 0	15.02	8, 6	3	600	Br.	" "	
21	7 39 24	71.51	7 39 0	16.19	8, 7	3	600	Br.	" "	
1896										
Dec. 11	10 0 30	282.51	10 13 0	13.72	4, 4	5	600	Br.	26-inch	
1897										
Oct. 13	14 56 30	256.95	14 58 0	16.82	8, 6	4	600	Br.	26-inch	
17	14 17 0	30.90	14 19 30	12.90	8, 6	3	600	Br.	" "	Very unsteady; satellite faint.
18	14 11 36	302.07	14 14 0	12.04	8, 6	3	600	Br.	" "	Steady; satellite faint.
29	13 19 30	15.36	13 38 30	11.72	4, 6	2	600	Br.	" "	Clouded over; poor observation.
30	13 19 30	288.60	13 20 0	13.41	8, 6	4	600	Br.	" "	
Nov. 3	13 26 0	62.73	13 27 0	15.94	8, 6	3	600	Br.	" "	
4	13 0 30	5.24	13 1 0	10.68	8, 6	3	600	Br.	" "	
6	12 32 0	241.71	12 32 30	16.76	8, 6	3	600	Br.	" "	Moonlight; satellite very difficult.
13	12 4 30	171.96	12 5 30	10.47	8, 8	2	600	Br.	" "	Moonlight; very faint, unsteady, and diffuse.
17	12 2 48	272.71	12 3 0	15.70	8, 8	2	600	Br.	" "	Unsteady and diffuse; satellite faint.
20	12 6 48	90.10	12 8 30	15.64	8, 8	3	600	Br.	" "	
23	11 45 48	268.06	11 47 30	16.27	9, 8	2	600	Br.	" "	
24	11 23 0	228.46	11 24 0	15.34	8, 6	4	600	Br.	" "	
27	11 10 48	44.21	11 11 0	14.57	8, 8	2	600	Br.	" "	
29	11 4 12	264.66	11 4 30	16.71	8, 8	3	600	Br.	" "	
Dec. 7	11 9 54	128.80	11 11 0	11.29	8, 8	2	600	Br.	" "	Bright moonlight; satellite very faint.
11	9 23 36	257.23	9 32 30	16.98	5, 8	4	600	Br.	" "	Seeing steady but sky thick.
12	9 15 0	214.14	9 15 0	13.28	8, 8	2	600	Br.	" "	Moonlight; planet woolly; satellite faint.
15	9 38 30	24.51	9 37 0	12.71	9, 8	2	600	Br.	" "	
16	9 31 0	300.28	9 51 0	12.38	4, 8	2	600	Br.	" "	Thick; very difficult; clouds.
23	9 11 48	248.06	9 12 0	17.14	8, 8	3	600	Br.	" "	Clear; high wind; telescope steady.
26	9 36 30	65.62	9 37 12	16.43	8, 8	3	600	Br.	" "	Observation difficult.
30	9 41 12	183.68	9 46 30	11.03	8, 8	2	600	Br.	" "	Very poor, difficult; satellite very faint.
1898										
Jan. 1	8 53 48	60.69	8 53 30	16.14	8, 8	2	600	Br.	26-inch	Wind shakes telescope; diffuse.
4	7 57 12	240.60	7 56 30	16.71	8, 8	3	600	Br.	" "	
5	8 58 0	175.45	8 59 30	10.64	8, 8	4	600	Br.	" "	Bright moonlight; planet steady; satellite faint.
8	8 32 30	351.85	8 31 30	10.50	8, 8	2	600	Br.	" "	Very poor, faint; unsteady.
13	8 3 12	52.14	8 8 30	15.10	8, 8	3–2	600	Br.	" "	Seeing grows very bad.
17	9 34 30	148.42	9 51 30	10.28	4, 8	2	600	Br.	" "	Very faint; clouds interrupt.
18	7 34 0	87.96	7 33 30	15.40	8, 8	4	600	Br.	" "	
21	7 46 48	264.82	7 50 48	16.34	8, 8	3	600	Br.	" "	Clouds interfere; satellite bright.
24	7 30 30	82.16	7 30 0	15.90	8, 8	3	600	Br.	" "	
28	7 26 18	218.66	7 26 30	14.05	8, 8	2	600	Br.	" "	Very poor.
Feb. 7	7 9 30	299.56	7 9 0	11.78	8, 8	3	600	Br.	" "	
9	7 35 30	304.01	7 36 0	12.06	8, 8	3	600	Br.	" "	Very faint.
10	7 1 30	117.32	7 2 0	11.84	9, 8	4	600	Br.	" "	Faint but steady.
12	7 32 30	17.82	7 32 0	11.60	8, 8	2	600	Br.	" "	Wind shakes telescope; faint, diffuse.
13	6 37 48	302.15	6 38 30	12.68	8, 8	2–3	600	Br.	" "	Very faint at first.
26	7 32 0	230.77	7 32 0	15.65	8, 8	3	600	Br.	" "	

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SATELLITE OF NEPTUNE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1898	h m s	°	h m s	″						
Mar. 5	7 55 30	156.30	7 54 30	10.06	8, 8	3	600	Br.	26-inch	
1899										
Oct. 6	13 34 54	254.21	13 35 12	17.09	10, 10	2–3	600	See	26-inch	Hazy, unsteady.
9	13 43 0	72.16	13 45 30	16.81	10, 12	..	600	See	" "	Satellite difficult; clouds; dew on object-glass.
10	13 56 0	20.90	13 57 0	11.49	10, 10	5	600	See	" "	Limb sharp; mottled detail on disk of planet.
18	14 9 36	245.15	14 10 30	15.90	10, 10	..	600	See	" "	Satellite difficult; bright moonlight; hazy.
20	12 35 48	106.94	12 35 48	14.80	10, 12	..	600	See	" "	Very difficult; bright moonlight.
21	12 45 24	61.84	12 46 30	16.80	10, 10	..	400	See	" "	Unsteady; very difficult; bright moonlight.
24	13 52 30	239.09	13 53 12	15.76	10, 12	4–5	600	See	" "	Markings on disk seen distinctly, but
25	12 51 24	173.82	12 51 24	10.61	10, 10	..	600	See	" "	only for a moment.
26	12 47 48	104.10	12 47 12	15.19	10, 10	3–4	600	See	" "	Image steady but faint.
Nov. 1	12 10 30	96.23	12 10 30	15.95	10, 10	2–3	600	See	" "	Unsteady; hazy; satellite faint.
4	12 22 48	273.77	12 22 30	16.30	10, 10	..	600	See	" "	Hazy and moist; image badly blurred.
5	12 26 0	231.14	12 26 12	14.86	10, 10	..	600	See	" "	
6	12 0 0	153.78	11 59 48	11.03	10, 10	4–1	600	See	" "	Unsteady at times.
8	12 22 30	46.81	12 22 30	14.47	10, 10	4–5	600	See	" "	Quite steady; belts on planet unmistakable in 90°; smoky.
9	11 40 54	329.15	11 40 48	11.12	10, 10	..	600	See	" "	Hazy and fuzzy; bad seeing.
10	11 54 36	268.52	11 54 30	17.01	10, 10	3–4	600	See	" "	Limb steady; faint bands in 90°.
12	11 25 48	145.82	11 27 12	11.15	10, 10	2–3	600	See	" "	
13	11 8 54	86.63	11 9 12	16.59	10, 10	3–4	...	See	" "	
20	10 48 30	35.75	10 48 30	13.26	10, 10	2–3	600	See	" "	Much blurred and hazy.
21	10 19 30	311.56	10 24 30	11.79	5, 1	..	600	See	" "	
24	10 32 30	126.14	10 32 0	12.26	10, 10	2	600	See	" "	Moist and hazy; satellite difficult.
26	9 58 0	31.39	9 58 0	12.58	10, 10	2–3	600	See	" "	Hazy.
27	10 35 0	304.45	10 34 12	12.57	10, 10	2–3	600	See	" "	
28	10 44 12	255.41	10 44 0	17.11	10, 10	2	600	See	" "	Very hazy; satellite very difficult.
Dec. 2	9 56 36	20.40	9 57 12	11.21	10, 10	1–2	600	See	" "	Very hazy; bad definition.
3	10 50 12	294.39	10 50 0	12.87	10, 10	2	600	See	" "	Very hazy and blurred; satellite difficult.
4	9 54 54	252.71	9 55 0	17.73	10, 10	2	600	See	" "	Hazy and blurred.
6	9 49 12	113.28	9 48 48	13.84	10, 10	2	600	See	" "	Very hazy and blurred
8	10 3 0	12.34	10 4 0	11.63	10, 10	3–4	600	See	" "	Image very good.
12	8 59 24	104.28	8 59 30	14.30	10, 10	2	600	See	" "	Hazy and blurred; satellite difficult.
15	11 14 12	279.64	11 14 30	15.66	10, 10	2–3	600	See	" "	Blurred and hazy; bright moonlight; satellite very difficult.
17	9 33 36	178.64	9 34 12	11.79	10, 10	3	600	See	" "	Clouds; satellite very faint.
20	9 50 24	350.65	9 51 12	10.69	10, 10	2–4	600	See	" "	Hazy at first, but afterwards more distinct.
21	9 34 54	278.40	9 35 0	16.05	10, 10	3–4	600	See	" "	Limb a little fuzzy.
22	9 10 48	237.95	9 10 48	15.99	10, 10	3–4	600	See	" "	Clear and steady; suspect belts in 95°.
24	9 39 0	94.23	9 39 12	16.00	10, 10	2	600	See	" "	Excessively hazy; satellite very difficult.
26	9 20 36	340.18	9 19 30	10.96	10, 10	1–2	600	See	" "	Unsteady and hazy.
1900										
Jan. 2	7 22 6	272.05	7 22 30	16.25	10, 10	1–2	600	See	26-inch.	Very hazy and blurred; satellite difficult.
3	8 7 30	227.90	8 7 30	15.10	10, 10	2	600	See	" "	Hazy; satellite difficult.
4	8 9 36	150.75	8 10 0	10.93	10, 10	2–3	600	See	" "	Sky thick; satellite faint.
6	8 4 6	44.30	8 4 12	14.29	10, 10	2–3	600	See	" "	Satellite quite distinct.
8	7 6 48	266.15	7 6 48	16.93	10, 10	2–3	600	See	" "	
8	11 1 24	260.35	11 1 48	17.07	10, 10	3	600	See	" "	
9	6 35 54	224.60	6 34 48	14.96	10, 10	2	600	See	" "	Difficult.
9	10 35 36	215.23	10 35 12	13.49	10, 10	2–3	600	See	" "	Very fair definition.
14	8 26 12	256.60	8 25 48	17.42	10, 10	1	600	See	" "	Hazy and fearfully blurred.
15	8 58 30	212.35	8 58 42	13.16	10, 10	4	600	See	" "	Quite steady, but a little fuzzy.

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SATELLITE OF NEPTUNE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1900	h m s	°	h m s	″						
Jan. 15	12 20 36	202.40	12 20 30	12.13	10, 10	3-4	600	See	26-inch	
21	7 7 0	209.38	7 6 48	12.71	10, 10	2-3	600	See	" "	Satellite fairly distinct.
21	11 27 54	195.60	11 28 0	11.21	10, 10	3	600	See	" "	Difficult.
22	6 31 48	122.17	6 32 48	12.83	10, 10	2-3	600	See	" "	Fairly distinct.
23	6 56 24	75.15	6 56 48	16.79	10, 10	1-2	600	See	" "	Very blurred.
23	11 25 48	67.29	11 26 0	16.55	10, 10	2-3	600	See	" "	
26	7 37 6	250.15	7 36 30	17.55	10, 10	1-2	600	See	" "	Windy and blurred.
27	7 29 12	200.40	7 28 48	11.84	10, 10	2-3	600	See	" "	
27	12 14 36	182.04	12 14 30	10.94	10, 10	2-3	600	See	" "	Satellite difficult.
29	7 3 24	68.13	7 3 30	16.75	10, 10	1-2	600	See	" "	Blurred and difficult.
29	11 25 36	63.27	11 25 48	15.85	10, 10	2-1	600	See	" "	Hazy and blurred.
Feb. 1	7 15 6	248.56	7 14 48	16.87	10, 10	2	600	See	" "	Hazy and blurred.
2	7 46 48	181.74	7 46 30	11.15	10, 10	2-3	600	See	" "	Difficult.
9	8 57 30	96.20	8 57 12	15.38	10, 10	1-2	600	See	" "	Hazy and blurred; bright moonlight.
13	7 25 24	238.23	7 25 30	15.66	10, 10	2	600	See	" "	Hazy and blurred.
14	7 33 54	167.05	7 33 30	10.24	10, 10	4	600	See	" "	Limb sharp and steady; belts seen on planet.
27	7 29 30	83.50	7 29 30	16.56	10, 10	2	600	See	" "	Hazy.
1902										
Oct. 24	16 28 45	101.99	16 28 45	16.28	10, 10	..	600	D.	26-inch	Steady and clear.
28	16 14 45	235.03	16 14 15	14.39	10, 10	..	600	D.	" "	Fuzzy; very difficult.
29	16 41 15	154.10	16 41 0	11.39	10, 10	f	600	D.	" "	
30	16 14 30	96.33	16 15 15	16.05	10, 10	e	600	D.	" "	
31	16 44 0	50.96	16 43 45	13.68	10, 10	g	600	D.	" "	Fuzzy.
Nov. 1	16 3 0	327.27	16 2 45	11.88	10, 10	e	600	D.	" "	Satellite very faint.
2	16 4 30	272.43	16 4 15	16.51	10, 10	g	600	D.	" "	
21	14 43 0	205.87	14 44 45	11.74	10, 10	..	600	D.	" "	
Dec. 1	14 6 30	291.17	14 7 45	15.34	10, 10	g-f	600	D.	" "	
5	14 14 30	69.18	14 16 0	15.93	10, 10	g	600	D.	" "	
7	13 33 15	286.28	13 34 45	15.63	10, 10	g	600	D.	" "	
1903										
Jan. 6	11 8 30	263.97	11 8 45	16.48	10, 10	g	600	D.	26-inch	
22	10 5 30	19.61	10 6 30	10.86	10, 10	b	600	D.	" "	
Feb. 20	8 2 36	52.00	8 3 0	13.57	10, 10	p	600	D.	" "	
22	8 30 0	269.53	8 29 40	16.55	10, 10	g	600	D.	" "	
25	8 37 30	88.07	8 38 0	16.88	10, 10	..	600	D.	" "	
26	8 5 15	43.24	8 6 30	13.18	10, 10	..	600	D.	" "	
Mar. 3	7 34 45	84.92	7 35 15	16.77	10, 10	f	600	D.	" "	
12	7 27 58	257.50	7 28 17	15.97	10, 10	..	600	D.	" "	Very faint.
17	7 32 58	295.24	7 32 43	13.46	10, 10	f	600	D.	" "	
18	7 51 35	251.43	7 51 17	16.40	10, 10	f	600	D.	" "	
26	7 41 28	108.42	7 42 7	14.79	10, 10	f	600	D.	" "	
Sept. 12	15 24 35	112.07	15 25 19	14.68	8, 8	f	...	D.	" "	Satellite faint.
18	15 47 14	106.85	15 49 31	15.24	8, 8	p	600	D.	" "	Very difficult.
22	14 41 46	241.54	14 42 26	14.63	8, 8	f	600	D.	" "	
25	15 15 3	58.49	15 15 42	14.16	8, 8	e	700	D.	" "	
25	15 36 26	57.00	15 36 0	14.14	8, 8	e	700	D.	" "	
27	14 49 54	280.12	14 51 9	15.17	8, 8	f-g	785	D.	" "	
29	15 8 39	154.39	15 9 19	10.95	8, 8	g	785	D.	" "	
Dec. 18	12 23 3	295.27	12 24 0	14.53	10, 10	p-f	785	D.	" "	
1904										
Nov. 21	15 37 15	65.05	15 37 56	14.86	9, 8	e	400	Hd.	26-inch	Moonlight, but satellite distinct.
30	14 35 45	235 91	14 36 32	14.40	8, 8	f	400	Hd.	" "	Steady but woolly; satellite faint.
Dec. 14	11 16 1	93 70	11 15 43	16.16	8, 8	f	400	Hd.	" "	
16	10 47 25	325.04	10 47 33	12.53	9, 8	e	400	Hd.	" "	
18	11 21 16	221.68	11 21 16	13.03	8, 8	e	400	Hd.	" "	
19	10 30 20	141.52	10 31 25	12.79	8, 9	b	400	Hd.	" "	Satellite seen only at intervals.
29	9 42 52	264.50	9 43 25	17.33	8, 10	f	400	Hd.	" "	Somewhat unsteady and woolly.

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SATELLITE OF NEPTUNE—Continued.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	WASHINGTON MEAN TIME.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1905	h m s	°	h m s	"						
Jan. 1	9 22 9	81.53	9 22 52	16.69	10, 8	e	400	Hd.	26-inch	
16	9 31 46	247.77	9 33 38	16.01	8, 8	p	400	R.	" "	
27	9 25 39	280.36	9 24 29	16.90	8, 8	f	400	R.	" "	
Feb. 7	8 31 54	324.89	8 29 23	12.28	8, 8	f	400	R.	" "	Faint and difficult.
10	8 20 32	139.54	8 20 49	12.67	8, 9	f	400	R.	" "	
24	8 21 45	21.76	8 22 22	11.36	8, 8	g	400	R.	" "	Good observation.
Mar 10	9 2 48	242.92	9 2 59	15.21	8, 8	f	400	R.	" "	
13	7 43 17	63.57	7 44 26	14.84	8, 8	g	400	Hd.	" "	
25	8 20 51	50.26	8 20 45	13.36	10, 10	e	400	Hd.	" "	
31	8 51 30	41.26	8 51 53	11.96	8, 8	f	400	Hd.	" "	
Oct. 29	13 34 5	343.64	13 34 31	11.36	6, 6	g	600	Hd.	" "	
30	13 23 44	283.48	13 23 15	16.52	6, 6	e	600	Hd	" "	
Nov. 1	12 40 35	162.36	12 41 38	11.46	6, 6	p	600	Hd.	" "	
1906										
Jan. 5	11 49 31	136.46	11 49 18	12.77	7, 6	f	600	Hd.	26-inch	
6	10 15 7	91.10	10 15 33	16.68	6, 8	g	400	Hd.	" "	
16	9 30 54	208.03	9 31 50	11.57	6, 6	f	400	Hd.	" "	Clouds interfere.
18	11 35 46	78.17	11 36 12	16.01	6, 6	g	400	Hd.	" "	
24	8 39 47	78.17	8 31 53	16.13	6, 6	f	400	Hd.	" "	
24	10 40 3	74.06	10 40 20	15.85	6, 6	f	400	Hd.	" "	
28	10 41 8	184.01	10 42 0	10.93	8, 8	f	400	Hd.	" "	
29	8 22 25	115.24	8 22 55	15.16	8, 8	e	400	Hd	" "	
29	11 30 46	109.93	11 30 45	15.64	8, 8	e	400	Hd.	" "	
31	8 30 13	5.73	8 30 59	11.43	8, 8	f	400	Hd.	" "	Satellite faint.
31	10 46 38	355.88	10 44 38	11.34	8, 8	g	400	Hd.	" "	
Feb. 11	7 10 7	63.51	7 11 27	14.73	8, 9	g	400	Hd.	" "	
13	7 10 53	284.31	7 10 48	16.43	8, 9	f	400	Hd.	" "	
13	10 21 10	278.23	10 27 4	16.56	5, 8	e	400	Hd.	" "	Clouds interrupt.
16	7 38 40	100.01	7 39 56	16.00	8, 8	e	400	Hd.	" "	
16	9 28 18	96.87	9 28 43	16.61	8, 8	e	400	Hd.	" "	
17	7 34 31	56.02	7 34 20	13.96	8, 8	e	400	Hd.	" "	
19	7 39 2	277.30	7 39 44	16.49	8, 8	p	400	Hd.	" "	A faint star near satellite made measures difficult.
23	7 23 58	48.45	7 24 49	13.36	8, 10	f	400	Hd.	" "	
23	9 53 54	42.83	9 54 10	12.92	8, 8	f	400	Hd.	" "	
24	9 49 46	318.51	9 49 34	12.46	8, 8	f	400	Hd.	" "	
25	7 9 39	273.28	7 20 13	16.88	4, 9	f	400	Hd.	" "	Clouds interrupt.
25	9 34 32	269.68	9 33 3	16.21	8, 8	f	400	Hd	" "	
Mar. 6	8 10 52	84.43	8 11 59	16.47	9, 9	g	400	Hd.	" "	Bright moonlight.
10	8 13 52	205.20	8 14 10	11.41	8, 8	g	400	Hd.	" "	
20	8 0 55	294.46	8 1 38	15.02	8, 10	f	400	Hd.	" "	
23	8 25 48	111.08	8 25 58	14.86	10, 9	f	400	Hd.	" "	
1907 Dec. 27	These two observations of the satellite of Neptune will be published with the other observations of this satellite for the opposition 1907–08 in a following volume.									
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MEASURES OF DIAMETERS OF PLANETS AND SATELLITES.

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DIAMETER OF MERCURY.

ALONG PHASE AXIS.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1898	h m	"	"						
Feb. 23	23 ..	5.33	7.01	2	175	..	Br.	26-inch	Glaring; unsteady; edges of image blurred and indistinct; 15-inch cap.
Apr. 2	0 21	6.30	6.86	..	175	..	Br.	" "	Very unsteady; can measure at intervals only.
8	0 58	7.92	7.40	4	175	..	Br.	" "	Fairly good for daytime.
June 7	23 26	7.31	7.50	3	175	..	Br.	" "	Seeing good for daytime.
1899									
Jan. 18	22 54	6.28	7.19	..	...	..	Br.	26-inch	Very poor.
19	22 36	5.98	6.94	..	175	..	Br.	" "	Unsteady and diffuse.
Apr. 27	23 25	9.78	6.48	..	...	..	Br.	" "	
May 11	21 52	8.61	7.45	..	175	..	Br.	" "	Bright clear day; images good for daytime. Observation difficult.
11	22 8	8.00	6.92	..	785	..	Br.	" "	
14	21 46	7.69	7.04	2	600	..	Br.	" "	Thick; image faint and unsteady.
14	21 56	8.08	7.39	2	175	..	Br.	" "	Thick; image faint and unsteady.
19	21 55	7.28	7.29	..	175	..	Br.	" "	
23	22 0	6.49	6.95	..	600	..	Br.	" "	
23	22 15	6.79	7.28	..	175	..	Br.	" "	
24	22 19	6.45	7.02	..	600	..	Br.	" "	Planet very faint and diffuse.
24	22 32	6.75	7.35	..	175	..	Br.	" "	Planet very faint and diffuse.
25	22 55	6.22	6.88	..	600	..	Br.	" "	Very faint; difficult.
June 4	23 29	5.80	7.31	..	600	..	Br.	" "	
4	23 38	6.09	7.68	..	175	..	Br.	" "	
1900									
June 20	0 33	5.94	6.33	3-4	400	1	See	26-inch	Image blurred and unsteady; no markings.
20	0 40	5.51	5.87	4	400	1	See	" "	Sharper and steadier; this measure the better.
22	0 28	5.32	5.49	3	400	1	See	" "	
Aug. 16	23 55	7.74	6.64	3-4	600	2	See	" "	Horns faint and difficult to recognize.
17	0 7	7.26	6.23	3-4	600	1	See	" "	This set of measures the better.
24	20 40	5.12	5.47	5	400	3	See	" "	Fine image, beautifully defined.
24	20 49	5.12	5.47	5	600	3	See	" "	Limb sharp and steady.
24	20 55	5.19	5.54	5	600	3	See	" "	Markings on planet strongly suspected.
25	19 18	5.18	5.66	5	600	3	See	" "	
25	19 22	5.21	5.69	5	888	3	See	" "	
25	19 26	5.13	5.61	5	888	3	See	" "	No certain markings.
26	20 16	4.91	5.50	4-5	600	3	See	" "	
26	20 24	4.80	5.37	3-4	888	3	See	" "	Blurred; clouds interrupt.
27	20 26	5.12	5.86	4	400	3	See	" "	
27	20 30	5.16	5.91	4-5	600	3	See	" "	
27	20 36	4.97	5.69	3-4	888	3	See	" "	
27	20 46	5.15	5.90	3-4	600	2	See	" "	
28	20 42	4.59	5.36	4	400	3	See	" "	Limb very good.
28	20 47	4.47	5.22	4	600	3	See	" "	Very well defined.
28	20 51	4.51	5.27	4	600	3	See	" "	
29	20 31	4.43	5.27	4	400	3	See	" "	Hazy; planet faint.
29	20 36	4.56	5.43	4	400	3	See	" "	
29	20 40	4.58	5.45	4	400	3	See	" "	
30	20 41	4.30	5.21	4	400	3	See	" "	
30	20 48	4.33	5.25	3-4	400	3	See	" "	Sky white
Oct. 21	2 18	5.52	6.40	3	400	4	See	" "	Image unsteady.
21	2 21	5.10	5.91	3	400	4	See	" "	
1901									
Apr. 4	21 27	4.69	4.23	2-3	600	4	See	26-inch	Very unsteady; fairly good at moments.
4	23 58	5.00	4.52	2-3	600	4	See	" "	Very unsteady and blurred.

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DIAMETER OF MERCURY—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1901	h m	"	"						
Apr. 8	23 16	5.87	5.65	2–3	400	4	See	26-inch	Windy and unsteady.
10	23 8	5.54	5.48	3	400	4	See	" "	
10	23 25	6.02	5.96	2–3	400	4	...	" "	Observed by L. G. Hoxton.
11	20 43	5.80	5.82	4	400	4	See	" "	Limb very good.
11	20 55	6.61	6.63	3–4	400	4	...	" "	Observed by L. G. Hoxton.
15	22 7	5.31	5.64	4–5	400	4	See	" "	Limb very good but blurred at moments; no certain markings.
15	22 13	5.21	5.53	4–5	400	4	See	" "	
15	22 17	5.28	5.61	4–5	400	4	See	" "	
15	23 36	5.01	5.32	4	600	4	See	" "	Blurred.
16	21 15	5.55	5.96	4–5	400	4	See	" "	Limb sharp at times; good observation.
16	21 22	5.58	6.00	4–5	400	4	See	" "	
16	21 29	5.38	5.78	4	400	4	See	" "	
27	21 47	4.74	5.78	2–3	400	4	See	" "	Blurred.
27	21 53	4.83	5.89	3	400	4	See	" "	
27	22 4	4.77	5.82	4	400	4	See	" "	Limb very good.
28	21 19	4.75	5.85	4–5	400	4	See	" "	Limb quite sharp.
28	21 26	4.78	5.88	5	400	4	See	" "	
28	21 34	4.79	5.89	4	600	4	See	" "	
28	21 40	4.79	5.89	4	600	4	See	" "	
May 2	21 9	4.39	5.58	3–4	400	4	See	" "	
2	21 16	4.23	5.38	3–4	400	4	See	" "	
2	21 23	4.29	5.46	4	400	4	See	" "	
June 2	5 22	5.50	5.88	4	400	..	See	" "	Scattering clouds. No color cell recorded.
2	5 26	5.55	5.94	4	400	..	See	" "	Scattering clouds. No color cell recorded.
2	5 29	5.19	5.55	4	400	..	See	" "	Scattering clouds. No color cell recorded.
2	5 32	5.50	5.88	4	400	..	See	" "	Scattering clouds. No color cell recorded.
2	23 22	4.74	5.00	3	400	4	See	" "	Sky white; Mercury faint.
2	23 28	5.00	5.28	3	400	4	See	" "	Sky white; Mercury faint.
4	0 1	5.16	5.34	..	...	..	See	" "	No color cell recorded.
4	0 4	4.76	4.93	..	...	..	See	" "	No color cell recorded.
4	22 32	5.41	5.50	3–4	400	4	See	" "	
4	22 37	5.45	5.54	4	400	4	See	" "	Very good measures.
4	22 42	5.67	5.77	4	400	4	See	" "	
5	3 54	5.98	6.06	5	400	4	See	" "	Very good measures.
5	4 0	5.97	6.05	5	400	4	See	" "	Very good measures.
5	4 5	5.83	5.90	5	600	4	See	" "	Excellent measures.
5	4 10	5.85	5.92	5	600	4	See	" "	Image like half-moon; perfectly sharp.
5	4 14	5.78	5.85	5	600	4	See	" "	Excellent measures.
5	4 19	5.73	5.80	5	600	4	See	" "	
5	4 22	5.76	5.83	5	600	4	See	" "	
5	4 25	5.81	5.88	5	600	4	See	" "	
5	4 28	5.81	5.88	5	600	4	See	" "	Excellent measures.
5	4 44	5.83	5.90	5	600	4	See	" "	
6	3 40	5.93	5.89	5	600	4	See	" "	Like Moon in first quarter; excellent measures.
6	3 53	5.85	5.81	5	600	4	See	" "	Occasional clouds.
6	4 15	5.89	5.85	5	600	4	See	" "	Splendid seeing.
6	4 22	5.84	5.80	5	600	4	See	" "	Excellent measures on June 6.
6	4 28	5.90	5.86	5	600	4	See	" "	
6	4 32	5.96	5.92	5	600	4	See	" "	
6	4 35	5.81	5.77	5	600	4	See	" "	

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DIAMETER OF MERCURY—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1901	h m	"	"						
June 6	4 39	5.85	5.81	5	600	4	See	26-inch.	
6	4 44	5.82	5.78	5	600	4	See	" "	
6	4 49	5.93	5.89	5	600	4	See	" "	
8	3 18	6.09	5.82	5	400	4	See	" "	
8	3 26	6.15	5.88	5	400	4	See	" "	
8	3 32	6.07	5.80	5	400	4	See	" "	
8	3 37	6.30	6.02	5	400	4	See	" "	
8	3 43	6.13	5.86	5	400	4	See	" "	
8	3 49	6.11	5.84	5	400	4	See	" "	
8	3 59	6.13	5.86	5	400	4	See	" "	
8	4 3	6.21	5.93	5	400	4	See	" "	
8	4 8	6.10	5.82	5	400	4	See	" "	
8	4 12	6.19	5.91	5	400	4	See	" "	
8	4 45	6.14	5.86	5	600	4	See	" "	
8	4 48	6.15	5.87	5	600	4	See	" "	
8	4 50	6.24	5.96	5	600	4	See	" "	
8	4 54	6.19	5.91	5	600	4	See	" "	Excellent measures.
8	4 56	6.15	5.87	5	600	4	See	" "	Excellent measures.
8	5 6	6.16	5.88	5	600	4	See	" "	Excellent measures. Surface examined; no markings seen.
8	5 8	6.15	5.87	5	600	4	See	" "	Excellent measures.
8	5 10	6.17	5.89	5	600	4	See	" "	
8	5 12	6.13	5.85	5	600	4	See	" "	
8	5 15	6.21	5.93	5	600	4	See	" "	
9	3 50	6.42	6.01	5	400	4	See	" "	
9	3 56	6.35	5.95	5	400	4	See	" "	
9	4 0	6.23	5.83	5	400	4	See	" "	
9	4 3	6.28	5.88	5	400	4	See	" "	
9	4 8	6.24	5.84	5	400	4	See	" "	
9	4 16	6.39	5.98	5	400	4	See	" "	
9	4 19	6.27	5.87	5	400	4	See	" "	
9	4 21	6.20	5.80	5	400	4	See	" "	
9	4 28	6.25	5.85	5	400	4	See	" "	
9	4 33	6.32	5.91	5	400	4	See	" "	
9	4 45	6.33	5.92	5	600	4	See	" "	
9	4 49	6.22	5.82	5	600	4	See	" "	
9	4 54	6.27	5.87	5	600	4	See	" "	
9	4 58	6.27	5.87	5	600	4	See	" "	
9	5 3	6.32	5.91	5	600	4	See	" "	
9	5 7	6.30	5.89	5	600	4	See	" "	
9	5 11	6.34	5.93	5	600	4	See	" "	
9	5 15	6.24	5.84	5	600	4	See	" "	
9	5 19	6.24	5.84	5	600	4	See	" "	
9	5 23	6.26	5.86	5	600	4	See	" "	
10	3 50	6.44	5.91	5	400	4	See	" "	Very good measures on this day. Disk like half-moon; no markings.
10	3 53	6.44	5.91	5	400	4	See	" "	
10	3 57	6.48	5.95	5	400	4	See	" "	The Washington mean times for June 10 are given as recorded in the observing book. As published by Professor See in Astron. Nach., Nr. 3737 all the times except the first three have been decreased one hour each.
10	5 1	6.46	5.92	5	400	4	See	" "	
10	5 5	6.38	5.85	5	400	4	See	" "	
10	5 10	6.40	5.87	5	400	4	See	" "	
10	5 14	6.41	5.88	5	400	4	See	" "	

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DIAMETER OF MERCURY—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1901	h m	"	"						
June 10	5 18	6.48	5.94	5	400	4	See	26-inch	
10	5 22	6.49	5.95	5	400	4	See	" "	
10	5 24	6.41	5.88	5	400	4	See	" "	
10	5 32	6.42	5.88	5	600	4	See	" "	
10	5 36	6.44	5.90	5	600	4	See	" "	
10	5 38	6.51	5.96	5	600	4	See	" "	
10	5 41	6.42	5.88	5	600	4	See	" "	
10	5 43	6.48	5.94	5	600	4	See	" "	
10	5 50	6.43	5.89	5	600	4	See	" "	
10	5 52	6.50	5.96	5	600	4	See	" "	
10	5 55	6.35	5.82	5	600	4	See	" "	
10	5 57	6.42	5.88	5	600	4	See	" "	
10	5 59	6.40	5.86	5	600	4	See	" "	
11	4 2	6.61	5.94	5	400	4	See	" "	
11	4 6	6.61	5.94	5	400	4	See	" "	
11	4 11	6.58	5.91	5	400	4	See	" "	
11	4 15	6.62	5.95	5	400	4	See	" "	
11	4 20	6.61	5.94	5	400	4	See	" "	
11	4 26	6.69	6.01	5	400	4	See	" "	
11	4 30	6.70	6.02	5	400	4	See	" "	
11	4 34	6.66	5.98	5	400	4	See	" "	
11	4 37	6.65	5.97	5	400	4	See	" "	
11	4 44	6.69	6.01	5	400	4	See	" "	
11	4 50	6.69	6.01	5	600	4	See	" "	
11	4 56	6.61	5.94	5	600	4	See	" "	
11	5 1	6.59	5.92	5	600	4	See	" "	
11	5 4	6.62	5.95	5	600	4	See	" "	
11	5 8	6.59	5.92	5	600	4	See	" "	
11	5 12	6.55	5.88	5	600	4	See	" "	
11	5 15	6.71	6.03	5	600	4	See	" "	Planet like half-moon, with sharp and quiescent limb. Carefully examined for markings; nothing seen.
11	5 19	6.75	6.06	5	600	4	See	" "	
11	5 23	6.66	5.98	5	600	4	See	" "	
11	5 27	6.64	5.96	5	600	4	See	" "	
18	5 24	7.91	6.14	4–5	400	4	See	" "	Steady; image rather faint.
1902									
May 30	0 19	7.91	6.24	4	400	4	See	26-inch	Tremulous, but well seen at moments.
30	0 25	7.80	6.15	4	400	4	See	" "	Cusps quite sharp.
30	2 0	7.70	6.06	4–5	175	4	See	" "	
30	2 5	7.75	6.10	5	400	4	See	" "	
30	2 10	7.72	6.08	5	400	4	See	" "	Excellent measures.
30	2 14	7.77	6.12	5	400	4	See	" "	Excellent measures.
30	2 18	7.74	6.09	5	400	4	See	" "	
30	2 22	7.70	6.06	5	400	4	See	" "	Fine image.
30	2 25	7.76	6.11	5	400	4	See	" "	
30	2 32	7.70	6.06	5	400	4	See	" "	
30	2 35	7.83	6.16	5	400	4	See	" "	Excellent measures.
30	2 38	7.80	6.14	5	400	4	See	" "	
30	22 55	7.96	6.14	4–5	400	4	See	" "	
30	22 58	8.00	6.17	4–5	400	4	See	" "	
30	23 1	7.99	6.16	4–5	400	4	See	" "	

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DIAMETER OF MERCURY—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1902	h m	"	"						
May 30	23 5	8.00	6.17	4-5	400	4	See	26-inch	
30	23 10	7.91	6.10	4-5	400	4	See	" "	
30	23 12	7.83	6.04	4-5	400	4	See	" "	
30	23 15	8.06	6.22	4-5	400	4	See	" "	
30	23 17	8.00	6.17	4-5	400	4	See	" "	
June 1	4 24	8.27	6.20	4-5	...	..	See	" "	No color cell recorded.
1	4 26	8.26	6.20	4-5	...	..	See	" "	No color cell recorded.
1	4 28	8.25	6.19	4-5	...	..	See	" "	No color cell recorded.
1	4 30	8.26	6.20	4-5	...	..	See	" "	No color cell recorded.
1	4 33	8.34	6.26	4-5	...	..	See	" "	No color cell recorded.
1	4 35	8.26	6.20	4-5	...	..	See	" "	Last measure exceptionally good. No color cell recorded.
2	1 52	8.19	6.02	4-5	400	4	See	" "	
2	1 58	8.23	6.05	4-5	400	4	See	" "	
2	2 4	8.19	6.02	4-5	400	4	See	" "	
2	2 12	8.18	6.01	4-5	400	4	See	" "	Clouds interrupt.
3	3 5	8.47	6.08	4-5	400	4	See	" "	
3	3 9	8.59	6.17	4-5	400	4	See	" "	
3	3 12	8.59	6.17	4-5	400	4	See	" "	
3	3 19	8.62	6.19	4-5	400	4	See	" "	
3	3 22	8.69	6.24	4-5	400	4	See	" "	
3	3 25	8.58	6.16	4-5	400	4	See	" "	
3	3 28	8.67	6.22	4-5	400	4	See	" "	
3	3 30	8.58	6.16	4-5	400	4	See	" "	Consider the measures on this night very good.
4	2 18	8.58	6.03	4-5	400	4	See	" "	
4	2 23	8.58	6.03	4-5	400	4	See	" "	Unsteady; hazy; clouds.

Each measured diameter depends upon ten settings of the micrometer, five on each side of coincidence. Correction for differential refraction is negligible in every case.

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DIAMETER OF VENUS.

0°–180°

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.				
1897	h m	"	"	"		"	"				
May 9	22 59	58.48	0.82	0.02	4	59.32	18.22	..	F.	12-inch	
16	23 49	50.09	1.40	0.02	4	51.51	17.36	..	F.	" "	
17	23 48	49.23	1.48	0.02	4	50.73	17.36	..	F.	" "	
19	0 0	46.69	1.49	0.02	4	48.20	16.75	..	F.	" "	
20	2 11	46.13	1.48	0.03	4	47.64	16.84	..	F.	" "	
21	1 20	45.54	1.54	0.02	4	47.10	16.90	..	F.	" "	
21	23 13	46.02	1.56	0.02	5	47.60	17.33	..	F.	" "	
1899											
July 21	22 59	9.00	0.00	0.00	12	9.00	14.82	4	See	12-inch	Limb steady and well defined; markings on disk suspected.
22	22 55	9.12	0.00	0.00	20	9.12	15.04	3	See	" "	Blurred at times, but generally steady with sharp limb; markings suspected.
28	0 35	9.06	0.00	0.00	10	9.06	15.10	4	See	" "	Image generally sharp; suspected markings
31	0 18	8.72	0.00	0.00	10	8.72	14.59	3	See	" "	Limb blurred and unsteady.
31	23 20	8.86	0.00	0.00	10	8.86	14.85	4	See	" "	Image quite sharp at times; suspected markings.
Aug. 3	23 2	8.72	0.00	0.00	10	8.72	14.65	3	See	" "	Limb fairly sharp, but unsteady at times.
5	23 42	8.75	0.00	0.00	10	8.75	14.74	2	See	" "	Clouds; limb unsteady.
19	23 5	8.43	0.02	0.00	10	8.45	14.44	2–5	See	" "	Image blurred, sharp at times; suspected markings.
Sept. 29	23 33	8.42	0.00	0.01	10	8.43	14.47	1–2	See	" "	Limb fuzzy and indefinite.
Oct. 1	22 45	8.61	0.00	0.01	9	8.62	14.79	1–2	See	" "	Sky very milky; limb faint and diffuse.
3	1 46	8.63	0.00	0.01	10	8.64	14.80	1–3	See	" "	Limb hazy.
7	1 20	9.29	0.00	0.01	10	9.30	15.90	3–4	See	" "	Quite steady, but limb hazy.
13	2 11	9.26	0.00	0.01	10	9.27	15.77	3	See	" "	
19	0 28	9.36	0.00	0.01	10	9.37	15.85	5	See	" "	Quite steady; suspected markings.
21	2 35	9.31	0.00	0.01	10	9.32	15.73	2–3	See	" "	
Nov. 4	.. ..	8.93	0.00	0.01	10	8.94	14.84	2	See	" "	Limb very blurred; image very unsteady.
7	0 53	9.29	0.00	0.01	10	9.30	15.37	2–3	See	" "	
11	23 44	9.38	0.00	0.01	10	9.39	15.42	2–3	See	" "	
20	0 12	9.75	0.00	0.01	10	9.76	15.78	2–4	See	" "	Much blurred at times.
20	23 38	9.77	0.00	0.01	10	9.78	15.78	2–3	See	" "	Image fairly good.
24	1 26	9.95	0.00	0.01	10	9.96	15.98	3–4	See	" "	Image very good; markings suspected; color deep golden yellow.
Dec. 1	23 30	9.70	0.00	0.01	10	9.71	15.36	2–3	See	" "	Rather unsteady.
2	0 55	10.25	0.00	0.01	10	10.26	16.19	3–4	See	" "	
5	0 18	10.16	0.00	0.01	10	10.17	15.95	2–3	See	" "	
8	1 1	9.86	0.00	0.01	10	9.87	15.38	5	See	" "	Limb sharp and quite steady; suspected markings.
9	1 37	10.16	0.00	0.01	10	10.17	15.80	3–4	See	" "	Fairly good.
1903											
Apr 17	5 9	13.15	0.13	0.01	10	13.29	17.45	g	K.	12-inch	Unsteady.

90°–270°

1899											
July 21	22 59	9.18	0.31	0.00	12	9.49	15.63	4	See	12-inch	
22	22 55	9.08	0.31	0.00	20	9.39	15.49	3	See	" "	
28	0 35	8.94	0.25	0.00	10	9.19	15.31	4	See	" "	
31	0 18	8.70	0.24	0.00	10	8.94	14.96	3	See	" "	
31	23 20	8.92	0.21	0.00	10	9.13	15.30	4	See	" "	

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DIAMETER OF VENUS—Continued.

90°–270°—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.				
1899	h m	"	"	"		"	"				
Aug. 3	23 2	8.63	0.19	0.00	11	8.82	14.82	3	See	12-inch	
5	23 42	8.63	0.15	0.00	10	8.78	14.79	2	See	" "	
19	23 5	8.45	0.05	0.00	10	8.50	14.52	2–5	See	" "	
Sept. 29	23 33	8.56	0.02	0.00	10	8.58	14.73	1–2	See	" "	
Oct. 1	22 45	8.54	0.02	0.00	10	8.56	14.69	1–2	See	" "	
3	1 46	8.45	0.02	0.00	10	8.47	14.52	1–3	See	" "	
7	1 20	9.45	0.02	0.00	10	9.47	16.18	3–4	See	" "	
13	2 11	9.22	0.07	0.01	10	9.30	15.82	3	See	" "	
19	0 28	8.93	0.09	0.00	10	9.02	15.26	5	See	" "	
21	2 35	9.01	0.11	0.00	10	9.12	15.39	2–3	See	" "	
Nov. 4	.. ..	8.97	0.18	0.00	10	9.15	15.18	2	See	" "	
7	0 53	9.38	0.24	0.00	10	9.62	15.90	2–3	See	" "	
11	23 44	9.47	0.28	0.00	10	9.75	16.01	2–3	See	" "	
20	0 12	9.93	0.37	0.00	10	10.30	16.65	2–4	See	" "	
20	23 38	9.63	0.39	0.00	10	10.02	16.16	2–3	See	" "	
24	1 26	9.87	0.44	0.00	10	10.31	16.54	3–4	See	" "	
Dec. 1	23 30	9.91	0.55	0.00	10	10.46	16.55	2–3	See	" "	
2	0 55	10.30	0.58	0.00	10	10.88	17.18	3–4	See	" "	
5	0 18	10.16	0.65	0.00	10	10.81	16.95	2–3	See	" "	
8	1 1	9.95	0.68	0.00	10	10.63	16.56	5	See	" "	
9	1 37	9.93	0.68	0.00	10	10.61	16.49	3–4	See	" "	

ALONG PHASE AXIS.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED.	UNIT DISTANCE.						
1897	h m	"	"		"	"						
June 10	21 42	35.16	0.01	8	35.17	17.60	..	...	..	Br.	26-inch	
20	21 30	30.54	0.01	8	30.55	17.65	..	175	..	Br.	" "	Image unsteady.
22	21 6	29.63	0.01	8	29.64	17.59	..	...	..	Br.	" "	
July 28	21 15	20.54	0.01	4	20.55	18.06	..	...	..	Br.	" "	
Aug. 25	20 18	16.28	0.00	10	16.28	17.67	2	175	..	Br.	" "	
Nov. 19	21 ..	11.34	0.01	12	11.35	17.60	4	175	..	Br.	" "	Image steady; light clouds.
23	22 0	11.13	0.01	10	11.14	17.43	2	175	..	Br.	" "	
Dec. 8	21 40	10.67	0.01	14	10.68	17.22	4	175	..	Br.	" "	Image faint; disk well defined.
27	22 11	10.02	0.01	13	10.03	16.65	2	175	..	Br.	" "	Seeing unsteady, but fair for daytime.
29	22 12	10.57	0.01	11	10.58	17.60	2	175	..	Br.	" "	
1898												
Jan. 4	23 12	10.25	0.01	10	10.26	17.19	4	175	..	Br.	26-inch	
Feb. 23	23 24	9.10	0.01	4	9.11	15.62	2	175	..	Br.	" "	Glaring; 15-inch cap.
Apr. 2	0 39	10.28	0.00	8	10.28	17.23	..	175	..	Br.	" "	Unsteady and diffuse.
8	0 35	10.88	0.00	8	10.88	18.10	4	175	..	Br.	" "	Fairly good for daytime.
18	0 47	10.42	0.00	10	10.42	17.07	2	175	..	Br.	" "	
30	0 0	10.77	0.00	6	10.77	17.24	2	175	..	Br.	" "	Very unsteady; good at moments.
May 18	0 28	11.57	0.00	8	11.57	17.70	2	175	..	Br.	" "	Woolly and unsteady.
June 2	23 35	12.36	0.00	8	12.36	17.95	..	175	..	Br.	" "	Very unsteady.
6	0 12	12.20	0.00	8	12.20	17.52	2	175	..	Br.	" "	
8	3 5	12.56	0.00	10	12.56	17.89	4	175	..	Br.	" "	

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DIAMETER OF VENUS—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED.	UNIT DISTANCE.						
1899	h m	"	"		"	"						
Jan. 18	22 30	35.01	0.04	8	35.05	17.71	2	...	..	Br.	26-inch	
19	21 45	34.29	0.03	8	34.32	17.59	4	175	..	Br.	" "	Seeing good for daytime.
19	22 15	33.80	0.04	6	33.84	17.35	4	175	..	Br.	" "	
24	21 37	31.85	0.03	10	31.88	17.53	2	175	..	Br.	" "	Unsteady; good at brief intervals.
29	22 25	29.55	0.03	12	29.58	17.39	4	175	..	Br.	" "	Thick, but seeing good for daytime.
Feb. 23	21 9	22.61	0.02	12	22.63	17.64	..	175	..	Br.	" "	Image clear but unsteady; becoming poorer; 12-inch cap.
24	21 51	22.18	0.02	8	22.20	17.48	..	175	..	Br.	" "	Seeing unsteady.
24	21 51	22.69	0.02	8	22.71	17.88	..	175	..	See	" "	Seeing unsteady.
27	21 31	22.05	0.02	8	22.07	17.89	..	175	..	Br.	" "	Seeing very good.
27	21 53	21.38	0.02	8	21.40	17.34	..	175	..	Br.	" "	12-inch cap; observation better than preceding.
Mar. 16	21 24	19.08	0.02	8	19.10	17.93	..	175	..	Br.	" "	Image scintillating and unsteady; 12-inch cap.
29	21 2	17.25	0.01	8	17.26	17.84	2	175	..	Br.	" "	Image unsteady; observation difficult.
Apr. 9	22 6	16.24	0.01	8	16.25	18.07	..	175	..	Br.	" "	Thick and occasional clouds; image fairly steady.
10	21 55	15.60	0.01	6	15.61	17.47	..	175	..	Br.	" "	
16	21 51	15.48	0.01	10	15.49	17.97	..	...	..	Br.	" "	Through haze and light clouds.
19	21 28	15.44	0.01	8	15.45	18.24	..	...	..	Br.	" "	
20	21 4	14.29	0.01	10	14.30	16.98	4	...	..	Br.	" "	Thick.
21	21 47	14.57	0.01	8	14.58	17.41	3	175	..	Br.	" "	Image unsteady; disk well defined.
23	22 12	14.42	0.01	8	14.43	17.43	3	...	..	Br.	" "	
23	22 27	14.60	0.01	4	14.61	17.64	3	...	..	Br.	" "	
24	21 20	14.45	0.01	8	14.46	17.56	3	175	..	Br.	" "	
24	21 41	14.26	0.01	6	14.27	17.33	3	400	..	Br.	" "	
26	21 15	14.24	0.01	10	14.25	17.49	..	...	..	Br.	" "	
27	21 44	14.84	0.01	8	14.85	18.32	..	...	..	Br.	" "	
28	22 10	14.06	0.01	7	14.07	17.45	2	...	..	Br.	" "	
30	21 36	13.88	0.01	8	13.89	17.41	3	...	..	Br.	" "	Thick; planet faint; edges rather woolly.
May 8	21 46	13.04	0.01	7	13.05	17.02	..	785	..	Br.	" "	
9	21 46	13.16	0.01	6	13.17	17.26	..	785	..	Br.	" "	Unsteady; image fairly good at times.
9	22 0	14.05	0.01	8	14.06	18.42	..	175	..	Br.	" "	
11	21 24	13.84	0.01	8	13.85	18.31	..	175	..	Br.	" "	Image good for daytime.
11	21 36	13.19	0.01	8	13.20	17.46	..	785	..	Br.	" "	
14	21 13	13.02	0.01	8	13.03	17.47	2	175	..	Br.	" "	Thick.
14	21 28	12.84	0.01	4	12.85	17.23	2	600	..	Br.	" "	Thick.
15	21 30	12.60	0.01	8	12.61	16.98	..	600	..	Br.	" "	Image very good for daytime.
15	21 43	13.22	0.01	8	13.23	17.82	..	175	..	Br.	" "	
23	21 24	12.34	0.00	8	12.34	17.19	..	600	..	Br.	" "	
23	21 38	12.92	0.00	8	12.92	18.00	..	175	..	Br.	" "	
24	21 43	12.36	0.00	8	12.36	17.29	..	600	..	Br.	" "	
24	21 59	12.69	0.00	8	12.69	17.75	..	175	..	Br.	" "	
25	22 0	12.38	0.00	8	12.38	17.38	..	600	..	Br.	" "	
25	22 14	12.78	0.00	8	12.78	17.95	..	175	..	Br.	" "	
28	21 28	12.45	0.00	8	12.45	17.69	..	600	..	Br.	" "	
28	21 38	12.81	0.00	8	12.81	18.20	..	175	..	Br.	" "	
June 4	22 10	12.11	0.00	8	12.11	17.66	..	600	..	Br.	" "	
4	22 22	12.56	0.00	8	12.56	18.32	..	175	..	Br.	" "	
7	22 24	12.13	0.00	4	12.13	17.88	..	600	..	Br.	" "	Clouds interrupt.

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DIAMETER OF VENUS—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"		"	"						
Apr. 3	2 30	18.34	0.01	10	18.35	16.70	4	400	1	See	26-inch	Limb not quite steady.
7	0 45	19.40	0.01	10	19.41	17.09	3-4	400	2	See	" "	
7	1 0	19.21	0.01	10	19.22	16.92	2	400	1	See	" "	
19	1 39	20.84	0.01	10	20.85	16.41	2-3	400	1	See	" "	Image quite blurred.
24	1 34	22.54	0.01	10	22.55	16.86	2-4	400	1	See	" "	
28	1 4	22.93	0.01	10	22.94	16.43	2-3	400	1	See	" "	Terminator appears reddish.
May 13	7 50	28.85	0.01	10	28.86	17.16	4-5	400	2	See	" "	Limb very sharp; no markings of any kind.
17	2 43	29.40	0.01	10	29.41	16.60	4-5	600	1	See	" "	Steady limb; no trace of sharp markings.
17	6 37	29.70	0.01	10	29.71	16.73	5	600	1	See	" "	Limb perfectly steady; no markings.
17	6 45	29.95	0.01	10	29.96	16.87	5	888	1	See	" "	Excellent measures.
June 1	2 57	37.10	0.01	10	37.11	16.74	3	600	1	See	" "	Somewhat unsteady.
5	7 13	40.02	0.01	10	40.03	16.88	3-4	600	1	See	" "	Limb very good; no markings of any kind.
20	0 18	51.10	0.02	10	51.12	17.11	3-4	400	1	See	" "	Image unsteady at times.
22	0 38	51.00	0.02	10	51.02	16.62	3-4	400	1	See	" "	Good measures.
22	0 44	51.07	0.02	10	51.09	16.64	3-4	400	1	See	" "	Excellent measures.
July 2	0 40	56.20	0.02	10	56.22	16.58	3-4	400	3	See	" "	Unsteady.
2	0 52	56.37	0.02	10	56.39	16.63	3-4	600	1	See	" "	
2	1 8	57.89	0.02	10	57.91	17.07	3-4	600	1	See	" "	Good measures; last one is best.
11	0 24	58.39	0.02	10	58.41	17.04	4	600	3	See	" "	Good measures.
11	0 32	58.29	0.02	10	58.31	17.01	4	600	1	See	" "	Excellent measures.
27	21 37	48.60	0.02	10	48.62	16.86	3-4	600	2	See	" "	
31	21 34	46.02	0.01	10	46.03	16.95	4	400	2	See	" "	
31	21 44	46.08	0.01	10	46.09	16.98	4	600	2	See	" "	
31	21 58	45.76	0.01	10	45.77	16.86	4	600	2	See	" "	Limb steady and sharp; no certain markings; a little tremulous.
Aug. 1	22 43	45.03	0.01	10	45.04	16.85	3-4	400	2	See	" "	Very good, but occasionally tremulous.
2	22 30	44.31	0.01	10	44.32	16.85	4	400	2	See	" "	Quite good, but unsteady at moments.
4	0 19	43.54	0.01	10	43.55	16.84	4	400	2	See	" "	Hazy and planet faint.
10	0 4	38.50	0.01	10	38.51	16.36	3-4	600	2	See	" "	Very unsteady; moist.
10	0 11	38.70	0.01	10	38.71	16.45	4	400	2	See	" "	
13	0 18	36.63	0.01	10	36.64	16.31	2-3	400	2	See	" "	
13	21 52	36.80	0.01	10	36.81	16.62	3-4	400	2	See	" "	
13	22 0	37.44	0.01	10	37.45	16.91	5	600	2	See	" "	
13	22 5	37.27	0.01	10	37.28	16.83	4	600	2	See	" "	
16	21 30	35.58	0.01	10	35.59	16.81	4-5	600	2	See	" "	Image perfectly sharp; no markings of any character.
17	21 5	34.87	0.01	10	34.88	16.72	3	600	2	See	" "	Image tremulous.
18	21 14	33.98	0.01	10	33.99	16.54	3-4	600	2	See	" "	Unsteady.
18	21 23	33.95	0.01	10	33.96	16.53	3-4	600	2	See	" "	
1903												
Nov. 10	17 2	33.01	0.02	20	33.03	18.22	p	116	..	K.	12-inch	Very unsteady; poor observation.
12	16 58	32.28	0.02	20	32.30	18.28	f	240	..	K.	" "	Unsteady.

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DIAMETER OF MARS.

ALONG PHASE AXIS.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1901	h m	"	"						
June 23	7 20	6.47	9.55	5	600	4	See	26-inch	
23	7 34	6.61	9.75	5	600	4	See	" "	
23	7 36	6.56	9.68	5	600	4	See	" "	
24	4 28	6.54	9.69	5	400	4	See	" "	Excellent measures.
24	4 38	6.43	9.53	5	400	4	See	" "	
24	4 58	6.39	9.47	5	400	4	See	" "	
24	5 2	6.45	9.56	5	400	4	See	" "	
24	5 11	6.38	9.46	5	400	4	See	" "	
24	5 43	6.24	9.25	5	400	4	See	" "	
24	5 ..	6.21	9.21	5	400	4	See	" "	
24	5 ..	6.33	9.38	5	400	4	See	" "	
24	6 ..	6.28	9.31	5	400	4	See	" "	
24	6 ..	6.25	9.27	5	400	4	See	" "	
25	5 ..	6.01	8.96	5	400	4	See	" "	
25	5 ..	6.06	9.03	5	400	4	See	" "	
25	5 ..	6.12	9.12	5	400	4	See	" "	
25	5 ..	6.11	9.10	5	400	4	See	" "	
25	5 ..	6.12	9.12	5	400	4	See	" "	
25	5 ..	6.04	9.00	5	600	4	See	" "	
25	5 ..	6.04	9.00	5	600	4	See	" "	
25	5 ..	6.02	8.97	5	600	4	See	" "	
25	5 ..	6.03	8.99	5	600	4	See	" "	Irradiation almost insensible.
25	6 8	6.03	8.99	5	600	4	See	" "	
26	4 ..	6.19	9.27	5	400	4	See	" "	
26	4 ..	6.20	9.28	5	400	4	See	" "	
26	5 ..	6.24	9.34	5	400	4	See	" "	
26	5 ..	6.19	9.27	5	400	4	See	" "	
26	5 ..	6.21	9.30	5	400	4	See	" "	
26	5 21	6.18	9.25	5	400	4	See	" "	
26	5 ..	6.22	9.31	5	400	4	See	" "	
26	5 ..	6.16	9.23	5	400	4	See	" "	
27	5 ..	6.13	9.23	5	400	4	See	" "	
27	5 ..	6.06	9.12	5	400	4	See	" "	
27	5 ..	6.12	9.21	5	400	4	See	" "	
27	5 ..	6.10	9.18	5	400	4	See	" "	
27	5 26	6.06	9.12	5	400	4	See	" "	
27	5 27	6.10	9.18	5	400	4	See	" "	
27	5 ..	6.15	9.26	5	400	4	See	" "	
27	5 ..	6.14	9.24	5	400	4	See	" "	
27	5 ..	6.06	9.12	5	400	4	See	" "	
27	5 ..	6.12	9.21	5	400	4	See	" "	
28	5 ..	6.06	9.17	5	400	4	See	" "	
28	5 ..	6.05	9.15	5	400	4	See	" "	
28	5 ..	6.14	9.28	5	400	4	See	" "	
28	5 ..	6.20	9.38	5	400	4	See	" "	
28	5 ..	6.06	9.16	5	400	4	See	" "	
28	5 ..	6.11	9.00	5	400	4	See	" "	
28	5 ..	6.07	9.18	5	400	4	See	" "	
28	5 ..	6.10	9.22	5	400	4	See	" "	
28	5 ..	6.03	9.12	5	400	4	See	" "	
28	5 57	6.11	9.24	5	400	4	See	" "	
29	5 2	6.19	9.41	4–5	400	4	See	" "	

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DIAMETER OF MARS—Continued.

ALONG PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1901	h m	"	"						
June 29	5 ..	6.07	9.22	4-5	400	4	See	26-inch.	
29	5 ..	6.03	9.16	4-5	400	4	See	" "	
29	5 ..	6.12	9.30	4-5	400	4	See	" "	
29	5 ..	6.04	9.18	4-5	400	4	See	" "	
29	5 ..	5.97	9.07	4-5	400	4	See	" "	
30	5 34	6.02	9.19	5	400	4	See	" "	
30	5 42	6.04	9.22	5	400	4	See	" "	
30	5 44	6.13	9.36	5	400	4	See	" "	
30	5 46	6.05	9.24	5	400	4	See	" "	
30	5 53	6.06	9.25	5	400	4	See	" "	Good measures.

PERPENDICULAR TO PHASE AXIS.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
				CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"	"						
June 23	7 26	5.87	0.70	6.57	9.70	5	600	4	See	26-inch	
23	7 30	5.93	0.70	6.63	9.78	5	600	4	See	"	
23	7 39	6.08	0.70	6.78	10.00	5	600	4	See	"	
24	4 31	5.56	0.70	6.26	9.28	5	400	4	See	"	
24	4 36	5.40	0.70	6.10	9.04	5	400	4	See	"	Excellent measures.
24	4 ..	5.43	0.70	6.13	9.09	5	400	4	See	"	
24	5 ..	5.32	0.70	6.02	8.92	5	400	4	See	"	
24	5 ..	5.40	0.70	6.10	9.04	5	400	4	See	"	
24	5 ..	5.34	0.70	6.04	8.95	5	400	4	See	"	
24	5 ..	5.39	0.70	6.09	9.03	5	400	4	See	"	Splendid definition.
24	6 ..	5.32	0.70	6.02	8.92	5	400	4	See	"	
24	6 ..	5.32	0.70	6.02	8.93	5	400	4	See	"	
24	6 4	5.33	0.70	6.03	8.94	5	400	4	See	"	
25	4 58	5.10	0.69	5.79	8.63	5	400	4	See	"	Polar caps beautifully defined.
25	5 ..	5.10	0.69	5.79	8.63	5	400	4	See	"	
25	5 ..	5.11	0.69	5.80	8.64	5	400	4	See	"	
25	5 ..	5.18	0.69	5.87	8.75	5	400	4	See	"	
25	5 33	5.13	0.69	5.82	8.67	5	400	4	See	"	
25	5 36	5.11	0.69	5.80	8.64	5	600	4	See	"	
25	5 ..	5.15	0.69	5.84	8.70	5	600	4	See	"	
25	5 ..	5.20	0.69	5.89	8.78	5	600	4	See	"	
25	5 ..	5.15	0.69	5.84	8.70	5	600	4	See	"	
25	6 ..	5.13	0.69	5.82	8.67	5	600	4	See	"	
26	4 47	5.87	0.69	6.56	9.82	5	400	4	See	"	
26	4 ..	5.79	0.69	6.48	9.70	5	400	4	See	"	
26	5 ..	5.69	0.69	6.38	9.55	5	400	4	See	"	
26	5 ..	5.71	0.69	6.40	9.58	5	400	4	See	"	
26	5 20	5.66	0.69	6.35	9.51	5	400	4	See	"	
26	5 ..	5.65	0.69	6.34	9.50	5	400	4	See	"	
26	5 ..	5.76	0.69	6.45	9.66	5	400	4	See	"	Too hazy to continue.
26	5 44	5.78	0.69	6.47	9.69	5	400	4	See	"	Irradiation almost insensible.

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DIAMETER OF MARS—Continued.

PERPENDICULAR TO PHASE AXIS—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
				CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"	"						
June 27	5 ..	5.61	0.68	6.29	9.47	5	400	4	See	26-inch	
27	5 ..	5.49	0.68	6.17	9.29	5	400	4	See	"	
27	5 ..	5.52	0.68	6.20	9.33	5	400	4	See	"	
27	5 ..	5.50	0.68	6.18	9.30	5	400	4	See	"	
27	5 ..	5.50	0.68	6.18	9.30	5	400	4	See	"	
27	5 ..	5.51	0.68	6.19	9.32	5	400	4	See	"	
27	5 ..	5.51	0.68	6.19	9.32	5	400	4	See	"	
27	5 ..	5.50	0.68	6.18	9.30	5	400	4	See	"	
27	5 ..	5.51	0.68	6.19	9.32	5	400	4	See	"	
27	5 44	5.50	0.68	6.18	9.30	5	400	4	See	"	
28	5 ..	5.33	0.68	6.01	9.09	5	400	4	See	"	
28	5 ..	5.42	0.68	6.10	9.22	5	400	4	See	"	
28	5 ..	5.46	0.68	6.14	9.29	5	400	4	See	"	
28	5 ..	5.41	0.68	6.09	9.21	5	400	4	See	"	
28	5 37	5.46	0.68	6.14	9.29	5	400	4	See	"	
28	5 ..	5.31	0.68	5.99	9.06	5	400	4	See	"	
28	5 ..	5.36	0.68	6.04	9.13	5	400	4	See	"	
28	5 ..	5.38	0.68	6.06	9.16	5	400	4	See	"	
28	5 ..	5.42	0.68	6.10	9.22	5	400	4	See	"	
28	5 ..	5.36	0.68	6.04	9.14	5	400	4	See	"	
29	5 ..	5.45	0.67	6.12	9.30	4–5	400	4	See	"	
29	5 ..	5.39	0.67	6.06	9.21	4–5	400	4	See	"	
29	5 ..	5.44	0.67	6.11	9.28	4–5	400	4	See	"	
29	5 ..	5.47	0.67	6.14	9.33	4–5	400	4	See	"	
29	5 24	5.39	0.67	6.06	9.21	4–5	400	4	See	"	
29	5 28	5.40	0.67	6.07	9.22	4–5	400	4	See	"	
30	5 54	5.37	0.67	6.04	9.22	5	400	4	See	"	
30	6 0	5.32	0.67	5.99	9.15	5	400	4	See	"	
30	6 3	5.37	0.67	6.04	9.22	5	400	4	See	"	
30	6 6	5.26	0.67	5.93	9.06	5	400	4	See	"	
30	6 10	5.32	0.67	5.99	9.15	5	400	4	See	"	

Each measured diameter depends on ten settings of the micrometer, five on each side of coincidence. Correction for differential refraction is negligible in every case.

0°–180°

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.					
1903	h m	"	"	"		"	"					
Feb. 5	15 25	13.92	0.10	0.01	10	14.03	12.96	g	115	K.	12-inch	Too unsteady for higher powers.
Apr. 17	7 50	15.68	0.06	0.01	10	15.75	10.41	e	115	K.	" "	
17	7 50	15.42	0.06	0.01	10	15.49	10.23	e	235	K.	" "	
28	8 37	14.25	0.11	0.01	20	14.37	10.10	g	705	K.	" "	

90°–270°

1903	h m	"	"	"		"	"					
Mar. 2	[16 0]	14.92	0.42	0.00	10	15.34	11.27	f	115	K.	12-inch	Too poor seeing to continue.

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DIAMETER OF NORTH POLAR CAP OF MARS.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.						
1901	h m	"	"						
June 27	5 4	0.78	1.17	5	400	4	See	26-inch	Blue around the base.
27	5 ..	0.72	1.08	5	400	4	See	" "	
28	5 5	0.67	1.01	5	400	4	See	" "	
28	5 59	0.64	0.97	5	400	4	See	" "	

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DIAMETER OF JUPITER.

EQUATORIAL.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"	"		"	"						
Mar. 31	15 ..	42.90	0.28	0.02	10	43.20	206.80	2–3	600	3	See	26-inch	Belts distinctly seen.
Apr. 7	15 40	42.97	0.24	0.01	10	43.22	202.75	3–4	400	3	See	" "	
14	15 5	43.62	0.20	0.01	10	43.83	201.84	5	400	3	See	" "	
19	14 15	44.09	0.16	0.01	10	44.26	201.36	3	888	1	See	" "	
26	13 16	44.55	0.12	0.02	10	44.69	200.25	4	600	3	See	" "	
May 12	14 0	45.68	0.03	0.01	10	45.72	199.77	3	888	1	See	" "	
13	12 5	45.62	0.02	0.02	10	45.66	199.31	2–4	600	1	See	" "	Limb fuzzy at times.
17	12 32	45.78	0.01	0.01	10	45.80	199.21	4	888	3	See	" "	
20	11 50	45.90	0.00	0.02	10	45.92	199.33	3–4	600	3	See	" "	Limb a little fuzzy.
22	12 4	46.50	0.00	0.02	10	46.52	201.74	3	600	3	See	" "	
30	10 40	45.88	0.00	0.02	10	45.90	198.82	3–4	600	1	See	" "	
June 4	10 38	45.82	0.01	0.02	10	45.85	198.90	3–4	600	1	See	" "	
5	10 42	46.02	0.01	0.02	10	46.05	199.87	3–4	600	1	See	" "	
6	11 16	45.72	0.02	0.01	10	45.75	198.68	4–5	600	1	See	" "	
8	10 51	45.80	0.02	0.01	10	45.83	199.29	3–4	888	1	See	" "	
20	10 5	45.33	0.08	0.01	10	45.42	200.15	4–2	600	1	See	" "	Unsteady.
22	9 27	44.64	0.09	0.02	10	44.75	197.79	4–2	400	1	See	" "	Clouded over.
23	10 5	44.67	0.10	0.01	10	44.78	198.25	3–4	600	1	See	" "	
24	10 6	44.81	0.11	0.01	10	44.93	199.25	3	600	1	See	" "	
July 1	8 53	44.28	0.15	0.02	10	44.45	199.71	3–4	600	3	See	" "	
10	8 34	43.24	0.21	0.01	10	43.46	199.21	3–4	600	3	See	" "	
11	7 40	42.88	0.21	0.02	10	43.11	198.07	4	600	3	See	" "	Effects of phase noticeable, but limb well seen.
13	8 45	43.65	0.22	0.01	10	43.88	202.62	3	600	2	See	" "	
14	8 32	42.96	0.23	0.01	10	43.20	199.99	3–4	...	..	See	" "	Color cell 2 probably used.
15	8 15	42.83	0.24	0.01	10	43.08	199.93	4–5	600	2	See	" "	
16	8 12	43.10	0.25	0.01	10	43.36	201.75	3–4	600	..	See	" "	Seeing fuzzy. Color cell 2 probably used.
1901													
Sept. 4	6 8	40.54	0.35	0.01	10	40.90	193.42	5	400	4	See	26-inch	
4	6 15	40.79	0.35	0.01	10	41.15	194.60	5	400	4	See	" "	Excellent measures; no irradiation.
5	6 11	40.27	0.35	0.01	10	40.63	192.73	4	400	4	See	" "	Irradiation insensible; image a little troubled at times.
5	6 16	40.28	0.35	0.01	10	40.64	192.77	4	400	4	See	" "	
6	5 59	40.35	0.35	0.01	10	40.71	193.68	4–5	400	4	See	" "	
6	6 8	40.56	0.35	0.01	10	40.92	194.69	4–5	400	4	See	" "	
6	6 15	40.61	0.35	0.01	10	40.97	194.93	5	400	4	See	" "	No irradiation; excellent measures.
6	6 18	40.64	0.35	0.01	10	41.00	195.07	5	400	4	See	" "	Excellent measures.
6	6 22	40.56	0.35	0.01	10	40.92	194.70	5	400	4	See	" "	
7	5 50	40.07	0.36	0.01	10	40.44	192.98	4–5	400	4	See	" "	
7	5 58	40.07	0.36	0.01	10	40.44	192.98	5	400	4	See	" "	
7	6 4	40.22	0.36	0.01	10	40.59	193.70	5	400	4	See	" "	Excellent measures; irradiation insensible on Sept. 7.
7	6 8	40.17	0.36	0.01	10	40.54	193.46	5	400	4	See	" "	
7	6 12	40.22	0.36	0.01	10	40.59	193.70	5	400	4	See	" "	
21	5 36	38.82	0.38	0.01	10	39.21	195.32	5	400	4	See	" "	
21	5 42	38.75	0.38	0.01	10	39.14	194.97	5	400	4	See	" "	Excellent measures.
21	6 7	39.03	0.38	0.01	10	39.42	196.37	5	600	4	See	" "	Irradiation about 0".02 at each limb.
22	5 32	38.37	0.38	0.01	10	38.76	193.66	5	400	4	See	" "	
22	5 39	38.52	0.38	0.01	10	38.91	194.41	5	400	4	See	" "	
22	5 47	38.70	0.38	0.01	10	39.09	195.32	5	400	4	See	" "	Irradiation insensible on Sept. 22.
23	4 52	38.03	0.38	0.01	10	38.42	192.54	5	400	5	See	" "	
23	4 56	38.22	0.38	0.01	11	38.61	193.49	5	400	5	See	" "	
23	5 17	38.04	0.38	0.01	10	38.43	192.60	5	400	5	See	" "	

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DIAMETER OF JUPITER—Continued.

EQUATORIAL—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"		"	"						
Sept. 23	5 20	38.40	0.38	0.01	10	38.79	194.40	5	400	5	See	26-inch	Excellent measures; irradiation wholly insensible.
23	5 25	38.30	0.38	0.01	10	38.69	193.90	5	400	5	See	" "	All measures taken before sunset.
23	5 34	38.24	0.38	0.01	10	38.63	193.60	5	400	5	See	" "	Excellent measures; irradiation wholly insensible.
24	4 34	37.54	0.38	0.01	10	37.93	190.66	5	400	5	See	" "	
24	4 38	37.57	0.38	0.01	10	37.96	190.81	5	400	5	See	" "	The first measures are probably a little small, because the phase limb was very faint in the bright sunlight.
24	4 42	37.68	0.38	0.01	10	38.07	191.36	5	400	5	See	" "	
24	4 45	37.59	0.38	0.01	10	37.98	190.90	5	400	5	See	" "	
24	4 50	38.17	0.38	0.01	10	38.56	193.83	5	400	5	See	" "	
24	4 53	38.15	0.38	0.01	10	38.54	193.73	5	400	5	See	" "	
24	4 55	37.92	0.38	0.01	10	38.31	192.57	5	400	5	See	" "	
24	4 57	38.00	0.38	0.01	10	38.39	192.98	5	400	5	See	" "	
24	5 2	37.92	0.38	0.01	10	38.31	192.58	5	400	5	See	" "	
24	5 5	37.96	0.38	0.01	10	38.35	192.78	5	400	5	See	" "	
25	5 16	38.01	0.37	0.01	10	38.39	193.57	5	400	5	See	" "	
25	5 18	37.90	0.37	0.01	10	38.28	193.01	5	400	5	See	" "	
25	5 20	38.16	0.37	0.01	10	38.54	194.32	5	400	5	See	" "	
25	5 22	38.05	0.37	0.01	10	38.43	193.77	5	400	5	See	" "	Excellent measures at 5^h 40^m. In the previous measures on Sept. 25 the planet was a little too faint.
25	5 25	38.15	0.37	0.01	10	38.53	194.28	5	400	5	See	" "	
25	5 28	38.20	0.37	0.01	10	38.58	194.53	5	400	5	See	" "	
25	5 30	38.09	0.37	0.01	10	38.47	193.98	5	400	5	See	" "	
25	5 33	38.10	0.37	0.01	10	38.48	194.03	5	400	5	See	" "	Excellent measures.
25	5 36	38.22	0.37	0.01	10	38.60	194.64	5	400	5	See	" "	
25	5 38	38.11	0.37	0.01	10	38.49	194.09	5	400	5	See	" "	
25	5 40	38.27	0.37	0.01	10	38.65	194.90	5	400	5	See	" "	
25	5 42	38.29	0.37	0.01	10	38.67	195.00	5	400	5	See	" "	Excellent measures.
25	5 50	38.20	0.37	0.01	10	38.58	194.55	5	400	5	See	" "	
25	5 52	38.24	0.37	0.01	10	38.62	194.75	5	400	5	See	" "	
25	5 53	38.27	0.37	0.01	10	38.65	194.90	5	400	5	See	" "	
25	5 54	38.33	0.37	0.01	10	38.71	195.20	5	400	5	See	" "	Excellent measures.
27	5 9	37.81	0.37	0.01	10	38.19	193.74	5	400	5	See	" "	
27	5 12	37.97	0.37	0.01	10	38.35	194.55	5	400	5	See	" "	
27	5 14	37.93	0.37	0.01	10	38.31	194.34	5	400	5	See	" "	Clouded over.
30	5 15	37.15	0.37	0.01	10	37.53	192.11	4–5	400	5	See	" "	
30	5 18	37.26	0.37	0.01	10	37.64	192.67	4–5	400	5	See	" "	
30	5 20	37.59	0.37	0.01	10	37.97	194.36	4–5	400	5	See	" "	
30	5 25	37.77	0.37	0.01	10	38.15	195.29	4–5	400	5	See	" "	
30	5 29	37.64	0.37	0.01	10	38.02	194.62	4–5	400	5	See	" "	
30	5 32	37.68	0.37	0.01	10	38.06	194.83	4–5	400	5	See	" "	
30	5 35	37.85	0.37	0.01	10	38.23	195.70	4	400	5	See	" "	
30	5 37	37.87	0.37	0.01	10	38.25	195.80	4	400	5	See	" "	
30	5 40	37.74	0.37	0.01	10	38.12	195.14	4	400	5	See	" "	
30	5 42	37.82	0.37	0.01	10	38.20	195.55	4	400	5	See	" "	
30	5 44	37.84	0.37	0.01	10	38.22	195.65	4–5	400	5	See	" "	
30	5 47	37.78	0.37	0.01	10	38.16	195.35	4–5	400	5	See	" "	
30	5 51	37.88	0.37	0.01	10	38.26	195.86	4–5	400	5	See	" "	Image rather tremulous.
30	5 54	37.90	0.37	0.01	10	38.28	195.97	4–5	400	5	See	" "	
Oct. 1	5 0	37.75	0.36	0.01	10	38.12	195.71	5	400	5	See	" "	
1	5 2	37.81	0.36	0.01	10	38.18	196.02	5	400	5	See	" "	
1	5 5	37.79	0.36	0.01	10	38.16	195.92	5	400	5	See	" "	
1	5 7	37.80	0.36	0.01	10	38.17	195.97	5	400	5	See	" "	

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DIAMETER OF JUPITER—Continued.

EQUATORIAL—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS.	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"		"	"						
Oct. 1	5 8	37.86	0.36	0.01	10	38.23	196.27	5	400	5	See	26-inch	
1	5 10	37.87	0.36	0.01	10	38.24	196.33	5	400	5	See	" "	
1	5 12	37.88	0.36	0.01	10	38.25	196.38	5	400	5	See	" "	
1	5 14	37.85	0.36	0.01	10	38.22	196.23	5	400	5	See	" "	
1	5 15	37.87	0.36	0.01	10	38.24	196.33	5	400	5	See	" "	
1	5 16	37.91	0.36	0.01	10	38.28	196.54	5	400	5	See	" "	
1	5 19	37.73	0.36	0.01	10	38.10	195.61	5	400	5	See	" "	
1	5 20	37.63	0.36	0.01	10	38.00	195.10	5	400	5	See	" "	
1	5 22	37.71	0.36	0.01	10	38.08	195.51	5	400	5	See	" "	
1	5 24	37.62	0.36	0.01	10	37.99	195.05	5	400	5	See	" "	
1	5 26	37.64	0.36	0.01	10	38.01	195.16	5	400	5	See	" "	
1	5 28	37.64	0.36	0.01	10	38.01	195.16	5	400	5	See	" "	
1	5 29	37.73	0.36	0.01	10	38.10	195.62	5	400	5	See	" "	
1	5 30	37.70	0.36	0.01	10	38.07	195.47	5	400	5	See	" "	
1	5 32	37.74	0.36	0.01	10	38.11	195.66	5	400	5	See	" "	
1	5 33	37.74	0.36	0.01	10	38.11	195.66	5	400	5	See	" "	Excellent measures on Oct. 1.
1903													
Oct. 14	[11 0]	48.60	0.17	0.02	10	48.79	201.36	e	335	..	K.	12-inch	
Nov. 3	7 58	45.95	0.32	0.01	20	46.28	201.50	g	240	..	K.	" "	Driving clock running badly.
7	8 11	45.47	0.35	0.01	20	45.83	202.03	g	240	..	K.	" "	Clouds thick at times decreasing irradiation.

The observations of the equatorial diameter of Jupiter in 1901 were made in daylight.

POLAR.

DATE	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"		"	"						
Mar. 31	15 ..	40.55	0.04	10	40.59	194.29	2–3	600	3	See	26-inch	
Apr. 7	15 40	41.30	0.05	10	41.35	193.98	3–4	400	3	See	" "	
14	15 5	40.92	0.05	10	40.97	188.67	5	400	3	See	" "	
19	14 25	40.77	0.04	10	40.81	185.66	3	888	1	See	" "	Clouded over.
26	13 5	42.18	0.05	10	42.23	189.23	4	600	3	See	" "	
May 12	13 53	42.40	0.05	10	42.45	185.48	3	888	1	See	" "	
13	12 18	42.99	0.05	10	43.04	187.87	2–4	600	1	See	" "	Limb occasionally rather fuzzy.
17	12 42	43.02	0.05	10	43.07	187.33	4	888	3	See	" "	
20	11 58	43.33	0.05	10	43.38	188.31	3–4	600	3	See	" "	Limb a little fuzzy.
22	11 57	43.52	0.05	10	43.57	188.95	3	600	3	See	" "	
30	10 50	42.90	0.05	10	42.95	186.04	3–4	600	1	See	" "	
June 4	10 44	42.78	0.04	10	42.82	185.76	3–4	600	1	See	" "	
5	10 50	42.72	0.04	10	42.76	185.59	3–4	600	1	See	" "	
6	11 21	42.77	0.04	10	42.81	185.91	4–5	600	1	See	" "	
8	11 0	42.89	0.04	10	42.93	186.68	3–4	888	1	See	" "	
20	10 10	42.58	0.04	10	42.62	187.81	4–2	600	1	See	" "	Unsteady.
22	9 32	41.94	0.04	10	41.98	185.55	4–2	400	1	See	" "	Clouded over.
23	10 9	41.82	0.04	10	41.86	185.33	3–4	600	1	See	" "	
24	10 14	41.74	0.04	10	41.78	185.28	3	600	1	See	" "	

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DIAMETER OF JUPITER—Continued

POLAR—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"		"	"						
July 1	9 3	41.16	0.04	10	41.20	185.11	3–4	600	3	See	26-inch	
10	8 42	40.55	0.04	10	40.59	186.05	3–4	600	3	See	" "	
11	7 45	40.59	0.04	10	40.63	186.67	4	600	3	See	" "	
13	8 53	41.25	0.04	10	41.29	190.67	3	600	2	See	" "	
14	8 36	40.33	0.04	10	40.37	186.89	3–4	...	..	See	" "	Color cell 2 probably used.
15	8 19	40.20	0.04	10	40.24	186.75	4–5	600	2	See	" "	
16	8 16	40.15	0.04	10	40.19	187.00	3–4	600	..	See	" "	Seeing fuzzy. Color cell 2 probably used.
1903												
Aug. 24	[13 0]	47.07	0.03	10	47.10	188.94	f	335	..	K.	12-inch	
Nov. 3	8 47	43.59	0.03	10	43.62	189.95	g	235	..	K.	" "	

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DIAMETERS OF SATELLITES OF JUPITER.

SATELLITE I.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Apr. 14	15 20	0.76	3.50	10	5	400	3	See	26-inch	
May 12	14 8	0.61	2.66	10	3–4	888	1	See	" "	
17	12 2	0.71	3.09	10	4–5	888	1	See	" "	
June 4	10 56	0.80	3.47	10	3	888	1	See	" "	Fuzzy.
5	11 1	0.70	3.04	10	4	888	1	See	" "	
6	11 26	0.58	2.52	10	4–5	888	1	See	" "	
8	11 6	0.68	2.96	10	3–4	888	1	See	" "	
23	10 13	0.90	3.98	10	3–4	888	1	See	" "	
July 11	7 54	0.79	3.63	10	4	888	3	See	" "	Sat. I is 10 per cent larger than II;
13	9 12	1.30	6.00	10	3	600	2	See	" "	good measures.
14	8 46	0.99	4.58	10	3–4	888	2	See	" "	
15	8 28	0.75	3.48	10	4–5	888	2	See	" "	Disk round, limb sharp.
16	8 21	0.80	3.72	10	4	888	2	See	" "	
17	9 6	0.74	3.45	10	4	888	2	See	" "	
27	7 20	0.60	2.88	10	3	888	2	See	" "	
28	8 10	0.67	3.22	10	3–4	888	2	See	" "	Sat. I estimated two-fifths the diame-
30	8 2	0.76	2.68	10	4	888	2	See	" "	ter of Sat. III.
1901										
May 15	16 7	0.95	4.27	10	4–5	600	4	See	26-inch	Poor observation; disk not well de-
										fined.
June 18	14 4	1.37	5.78	10	4	600	4	See	" "	No markings.
28	12 46	1.30	5.45	10	5	600	4	See	" "	Excellent measures; Sat. I against
28	12 55	1.19	4.99	10	5	600	4	See	" "	edge of planet.
28	12 57	1.02	4.28	10	5	600	4	See	" "	
30	11 32	0.71	2.98	10	5–4	400	4	See	" "	Excellent measures; no markings.
July 15	11 36	1.44	6.08	5	4	400	4	See	" "	Clouds interrupt.
20	11 10	1.41	5.99	10	4	400	4	See	" "	Excellent measures.
20	11 16	1.46	6.20	10	4	400	4	See	" "	Excellent measures.
Aug. 16	7 32	1.23	5.51	10	3–4	600	4	See	" "	Excellent measures; Sat. I perfectly
28	7 7	1.17	5.42	10	4–5	600	4	See	" "	round.
28	7 9	1.20	5.56	10	4–5	600	4	See	" "	Good measures.
29	7 17	1.14	5.30	10	5	600	4	See	" "	Absolutely round; no markings.
29	7 32	1.16	5.39	10	5	600	4	See	" "	Excellent measures.
Sept. 6	6 29	0.91	4.33	10	5	600	4	See	" "	Excellent measures; Sat. I is 10 per
6	6 38	1.13	5.38	10	5	600	4	See	" "	cent larger than II; irradiation per-
										haps 0".1 at each limb.
21	6 11	0.99	4.93	10	5	600	4	See	" "	Irradiation 0".1 at each limb.
23	5 22	0.85	4.26	10	5	400	5	See	" "	Excellent measures.
23	5 36	0.92	4.61	10	5	400	5	See	" "	
24	5 8	0.90	4.52	10	5	400	5	See	" "	Excellent measures; image perfect.
24	5 12	0.90	4.52	10	5	400	5	See	" "	No markings.
24	5 25	0.85	4.27	10	5	600	5	See	" "	
24	5 27	0.85	4.27	10	5	600	5	See	" "	
24	5 29	0.89	4.47	10	5	600	5	See	" "	Excellent observations; image round.
25	5 58	0.83	4.19	10	5	400	5	See	" "	
25	6 3	0.86	4.34	10	5	400	5	See	" "	Sat. I is 8 per cent larger than Sat. II;
										excellent measures.
Oct. 1	5 39	0.81	4.16	10	5	400	5	See	" "	Splendid seeing; images absolutely
										round.
1	5 40	0.78	4.00	10	5	400	5	See	" "	
1	5 41	0.75	3.85	10	5	400	5	See	" "	Sat. I is 10 per cent larger than II.
1	5 42	0.75	3.85	10	5	400	5	See	" "	
1	6 0	0.86	4.42	10	5	400	5	See	" "	
6	5 0	0.79	4.12	10	4–5	400	5	See	" "	

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DIAMETERS OF SATELLITES OF JUPITER—Continued.

SATELLITE I—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
Oct. 6	5 1	0.82	4.27	10	4–5	400	5	See	26-inch	
6	5 2	0.81	4.22	10	4–5	400	5	See	" "	
6	5 3	0.87	4.53	10	4–5	400	5	See	" "	
6	5 5	0.88	4.59	10	4–5	400	5	See	" "	Excellent measures on Oct. 6.
7	5 4	0.78	4.08	10	5	400	5	See	" "	
7	5 5	0.78	4.08	10	5	400	5	See	" "	
7	5 6	0.79	4.13	10	5	400	5	See	" "	
7	5 7	0.79	4.13	10	5	400	5	See	" "	
7	5 8	0.83	4.34	10	5	400	5	See	" "	
10	4 50	0.80	4.22	10	5	400	5	See	" "	Very good measures; images round and quiet; Sat. I is fully as bright as Jupiter; Sat. II a little brighter, while Sat. III is fainter; could see these three satellites half an hour before sunset.
10	4 51	0.79	4.16	10	5	400	5	See	" "	
10	4 52	0.81	4.27	10	5	400	5	See	" "	
10	4 53	0.80	4.22	10	5	400	5	See	" "	
10	4 54	0.80	4.22	10	5	400	5	See	" "	
10	4 55	0.83	4.38	10	5	400	5	See	" "	
10	5 13	0.77	4.06	10	5	400	5	See	" "	Sats. I and II only 18" apart in field; Sat. II is the brighter and a little smaller; ratio of diams. is about 7:8.
10	5 14	0.83	4.38	10	5	400	5	See	" "	
10	5 15	0.82	4.32	10	5	400	5	See	" "	

From September 6 to October 10, 1901, inclusive, the observations were made in daylight.

SATELLITE II.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Apr. 14	15 33	1.12	5.16	10	4	400	3	See	26-inch	
May 12	13 47	0.80	3.50.	10	3–4	888	1	See	" "	
17	12 15	0.78	3.39	10	4–5	888	1	See	" "	
June 4	10 58	0.70	3.04	10	3	888	1	See	" "	Fuzzy.
5	10 53	0.62	2.69	10	4	888	1	See	" "	
8	11 12	0.82	3.57	10	3–4	888	1	See	" "	
23	10 23	0.80	3.54	10	3–4	888	1	See	" "	
July 10	8 47	0.60	2.75	10	4	888	3	See	" "	
11	8 0	0.68	3.12	10	4	888	3	See	" "	Good measures.
13	9 21	1.00	4.62	10	3–4	600	2	See	" "	
14	8 49	0.88	4.07	10	3–4	888	2	See	" "	
15	8 26	0.61	2.83	10	4–5	888	2	See	" "	Disk absolutely round; limb sharp.
16	8 27	0.65	3.02	10	4	888	2	See	" "	Sat. II is one-fifth smaller than III.
17	8 52	0.55	2.57	10	3–4	888	2	See	" "	
27	7 28	0.55	2.64	10	3	888	2	See	" "	
28	8 12	0.57	2.74	10	3–4	888	2	See	" "	
30	8 5	0.60	2.90	10	4	888	2	See	" "	
1901										
May 15	16 5	0.78	3.51	10	4–5	600	4	See	26-inch	Observation of doubtful value; disk not well defined.
June 4	13 24	1.19	5.11	10	4–5	888	4	See	" "	Very good measures.

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DIAMETERS OF SATELLITES OF JUPITER—Continued.

SATELLITE II—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
June 18	14 12	1.27	5.35	10	4	600	4	See	26-inch	No markings.
28	12 51	1.01	4.24	10	5	600	4	See	" "	Excellent measures.
28	12 52	0.94	3.94	10	5	600	4	See	" "	Observation not so good as the preceding one.
28	12 59	0.88	3.69	10	4-5	400	4	See	" "	Poor; fringes troubling.
30	11 29	0.73	3.06	10	5-4	400	4	See	" "	Excellent measures; no markings; Sat II is 10 per cent smaller than I.
July 20	11 12	1.30	5.52	10	4	400	4	See	" "	Excellent measures.
21	11 4	1.20	5.10	10	4-5	400	4	See	" "	
Aug. 16	7 35	1.15	5.15	10	3-4	600	4	See	" "	Excellent measures.
20	7 24	1.09	5.06	10	5	600	4	See	" "	
29	7 30	1.08	5.02	10	5	600	4	See	" "	Excellent measures.
30	7 20	1.01	4.71	10	4	600	4	See	" "	Excellent measures.
Sept. 4	6 18	0.55	2.60	10	5	400	4	See	" "	Excellent measures.
6	6 32	0.98	4.66	10	5	600	4	See	" "	
6	6 36	1.00	4.76	10	5	600	4	See	" "	
21	6 14	0.92	4.58	10	4-5	600	4	See	" "	
23	5 11	0.67	3.36	10	5	400	5	See	" "	
23	5 12	0.76	3.81	10	5	400	5	See	" "	
23	5 24	0.79	3.96	10	5	400	5	See	" "	
23	5 37	0.83	4.16	10	5	400	5	See	" "	
24	5 15	0.78	3.92	10	5	400	5	See	" "	
24	5 16	0.80	4.02	10	5	400	5	See	" "	
24	5 19	0.83	4.17	10	5	400	5	See	" "	
24	5 23	0.75	3.77	10	5	600	5	See	" "	
24	5 25	0.76	3.82	10	5	600	5	See	" "	Excellent observations.
25	6 1	0.77	3.88	10	5	400	5	See	" "	
25	6 2	0.77	3.88	10	5	400	5	See	" "	Excellent measures.
Oct. 1	5 37	0.69	3.54	10	5	400	5	See	" "	Image absolutely round.
1	5 38	0.75	3.85	10	5	400	5	See	" "	
1	5 44	0.67	3.44	10	5	400	5	See	" "	
1	5 45	0.67	3.44	10	5	400	5	See	" "	
1	6 2	0.69	3.54	10	5	400	5	See	" "	
6	5 15	0.78	4.06	10	4-5	400	5	See	" "	Image a little blurred.
6	5 16	0.75	3.91	10	4-5	400	5	See	" "	
6	5 17	0.76	3.96	10	4-5	400	5	See	" "	
6	5 18	0.79	4.12	10	4-5	400	5	See	" "	
6	5 20	0.73	3.80	10	4-5	400	5	See	" "	
7	5 9	0.70	3.66	10	5	400	5	See	" "	
7	5 10	0.73	3.82	10	5	400	5	See	" "	
7	5 11	0.68	3.55	10	5	400	5	See	" "	
7	5 12	0.71	3.71	10	5	400	5	See	" "	Good measures; irradiation of Jupiter about twice that of Sat. III.
7	5 13	0.70	3.66	10	5	400	5	See	" "	
8	4 56	0.72	3.77	10	5	400	5	See	" "	
8	4 57	0.72	3.77	10	5	400	5	See	" "	
8	4 58	0.72	3.77	10	5	400	5	See	" "	Excellent measures; image perfectly round.
10	5 1	0.71	3.74	10	5	400	5	See	" "	Brightness of Sats. I, II, III about in the ratio 6:7:5.
10	5 2	0.71	3.74	10	5	400	5	See	" "	
10	5 3	0.70	3.69	10	5	400	5	See	" "	
10	5 8	0.71	3.74	10	5	400	5	See	" "	
10	5 9	0.72	3.80	10	5	400	5	See	" "	
10	5 11	0.74	3.90	10	5	400	5	See	" "	Excellent measures.

From September 4 to October 10, 1901, inclusive, the observations were made in daylight.

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DIAMETERS OF SATELLITES OF JUPITER—Continued.

SATELLITE III.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Apr. 14	15 30	1.77	8.15	10	5	400	3	See	26-inch	Disk sharp without trace of markings.
May 12	14 16	1.47	6.42	10	4	888	1	See	" "	Disk perfectly sharp and round.
17	12 9	1.53	6.66	10	4–5	888	1	See	" "	Disk perfectly round; no markings.
June 4	10 52	1.26	5.47	10	3	888	1	See	" "	Fuzzy.
5	10 58	1.49	6.47	10	4	888	1	See	" "	Sat. III about o".08 larger than IV; limb sharp: no certain markings.
6	11 28	1.55	6.73	10	4–5	888	1	See	" "	
8	11 22	1.56	6.78	10	3–4	888	1	See	" "	
23	10 18	1.48	6.55	10	3–4	888	1	See	" "	
July 10	8 53	1.59	7.29	10	4	888	3	See	" "	
11	8 5	1.79	8.22	10	4	888	3	See	" "	Good measures.
13	9 2	1.63	7.53	10	3	600	2	See	" "	
14	8 40	1.35	6.25	10	3–4	888	2	See	" "	
15	8 35	1.72	7.98	10	4–5	888	2	See	" "	Disk absolutely round; limb sharp.
16	8 24	1.63	7.58	10	4	888	2	See	" "	
17	9 0	1.61	7.51	10	3–4	888	2	See	" "	
27	7 24	1.61	7.72	10	3	888	2	See	" "	
28	8 5	1.46	7.02	10	3–4	888	2	See	" "	
30	8 6	1.61	7.79	10	4	888	2	See	" "	
1901										
May 15	16 10	1.79	8.04	10	4–5	600	4	See	26-inch	
June 4	13 26	2.18	9.36	10	4–5	888	4	See	" "	Very good measures.
18	14 9	2.43	10.24	10	4	600	4	See	" "	No markings.
28	13 0	2.00±	.....	..	4–5	888	4	See	" "	Diameter estimated; disk round; no markings.
Aug. 28	7 14	1.71	7.92	10	5	600	4	See	" "	Splendid image; limb perfectly sharp, absolutely round; no markings.
28	7 18	1.73	8.01	10	5	600	4	See	" "	
29	7 20	1.68	7.81	10	5	600	4	See	" "	
30	7 22	1.70	7.92	10	4	600	4	See	" "	Excellent measures.
Sept. 6	6 42	1.62	7.71	10	5	600	4	See	" "	Irradiation quite sensible, perhaps o".18 at each limb; good measures.
23	5 14	1.12	5.61	10	5	400	5	See	" "	Excellent measures.
23	5 27	1.21	6.06	10	5	400	5	See	" "	
23	5 38	1.22	6.12	10	5	400	5	See	" "	
24	5 12	1.14	5.73	10	5	400	5	See	" "	
24	5 14	1.17	5.88	10	5	400	5	See	" "	Excellent measures.
24	5 30	1.24	6.23	10	5	600	5	See	" "	
24	5 31	1.30	6.53	10	5	600	5	See	" "	
24	5 32	1.25	6.28	10	5	600	5	See	" "	Excellent measures.
25	6 4	1.37	6.91	10	5	400	5	See	" "	
25	6 5	1.43	7.21	10	5	400	5	See	" "	Excellent measures.
Oct. 1	5 47	1.29	6.62	10	5	400	5	See	" "	
1	5 48	1.36	6.98	10	5	400	5	See	" "	
1	5 49	1.31	6.73	10	5	400	5	See	" "	
1	5 50	1.32	6.78	10	5	400	5	See	" "	Excellent measures.
1	5 57	1.43	7.34	10	5	400	5	See	" "	Satellite very bright; irradiation o".10.
6	5 6	1.32	6.88	10	4–5	400	5	See	" "	Image a little blurred.
6	5 7	1.35	7.03	10	4–5	400	5	See	" "	
6	5 8	1.33	6.93	12	4–5	400	5	See	" "	
6	5 9	1.30	6.77	10	4–5	400	5	See	" "	
6	5 10	1.30	6.77	10	4–5	400	5	See	" "	
7	4 58	1.24	6.48	10	5	400	5	See	" "	
7	5 0	1.20	6.27	10	5	400	5	See	" "	

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DIAMETERS OF SATELLITES OF JUPITER—Continued.

SATELLITE III—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
Oct. 7	5 1	1.26	6.58	10	5	400	5	See	26-inch	
7	5 2	1.23	6.43	10	5	400	5	See	" "	
7	5 3	1.22	6.38	10	5	400	5	See	" "	Excellent measures; image nearly perfect.
8	4 50	1.23	6.45	10	5	400	5	See	" "	
8	4 50	1.22	6.39	10	5	400	5	See	" "	
8	4 51	1.22	6.39	10	5	400	5	See	" "	
8	4 52	1.23	6.45	10	5	400	5	See	" "	Excellent measures.
8	4 53	1.23	6.45	10	5	400	5	See	" "	Image round.
8	6 49	1.57	8.23	11	5	400	5	See	" "	
8	6 51	1.59	8.33	10	5	400	5	See	" "	
10	5 5	1.25	6.59	10	5	400	5	See	" "	Image perfectly round.
10	5 6	1.23	6.48	10	5	400	5	See	" "	
10	5 7	1.23	6.48	10	5	400	5	See	" "	
10	5 18	1.24	6.54	10	5	400	5	See	" "	
10	5 19	1.20	6.33	10	5	400	5	See	" "	
10	5 20	1.20	6.33	10	5	400	5	See	" "	Excellent measures on Oct. 10.

From September 6 to October 10, 1901, inclusive, the observations were made in daylight except the last two on October 8, 1901.

SATELLITE IV.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Apr. 14	15 38	1.51	6.95	10	3–4	400	3	See	26-inch.	
May 12	14 12	1.40	6.12	10	3–4	888	1	See	" "	
17	12 24	1.37	5.96	12	4–5	888	1	See	" "	
June 4	11 1	1.37	5.94	10	3	888	1	See	" "	Fuzzy.
5	11 5	1.20	5.21	10	4	888	1	See	" "	
6	11 32	1.52	6.60	10	4–5	888	1	See	" "	
8	11 17	1.50	6.52	10	3–4	888	1	See	" "	
23	10 20	1.48	6.55	10	3–4	888	1	See	" "	
July 10	8 59	1.31	6.00	10	4	888	3	See	" "	
11	7 57	1.57	7.21	10	4	888	3	See	" "	Good measures.
13	9 18	1.56	7.20	10	3	600	2	See	" "	
14	8 52	1.33	6.16	10	3–4	888	2	See	" "	
15	8 32	1.60	7.42	10	4–5	888	2	See	" "	Disk absolutely round; limb sharp
16	8 35	1.62	7.54	10	4	888	2	See	" "	
17	9 8	1.39	6.48	10	4	888	2	See	" "	
27	7 30	1.42	6.81	10	3	888	2	See	" "	
28	8 16	1.59	7.64	10	3–4	888	2	See	" "	
30	8 9	1.44	6.96	10	4	888	2	See	" "	
1901										
May 15	16 12	1.57	7.06	10	4–5	600	4	See	26-inch	
June 4	13 21	1.81	7.78	10	4–5	888	4	See	" "	
18	14 6	1.88	7.93	10	4	600	4	See	" "	Very good measures.

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DIAMETERS OF SATELLITES OF JUPITER—Continued.

SATELLITE IV—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
Aug. 28	7 21	1.60	7.41	10	5	600	4	See	26-inch	
28	7 23	1.62	7.50	10	5	600	4	See	" "	Excellent measures, with dark wires.
29	7 26	1.66	7.71	10	5	600	4	See	" "	Best view of Sat. IV I ever obtained; absolutely round; excellent measures.
29	7 29	1.64	7.62	10	5	600	4	See	" "	
30	7 27	1.61	7.50	10	5	600	4	See	" "	Excellent measures.
Sept. 6	6 44	1.47	6.99	10	5	600	4	See	" "	Irradiation not over half that of Sat. III; good measures.
23	5 31	1.12	5.61	10	5	400	5	See	" "	Excellent measures.
25	6 8	1.26	6.35	10	5	400	5	See	" "	
25	6 9	1.30	6.55	10	5	400	5	See	" "	Excellent measures.
Oct. 1	5 51	1.19	6.11	10	5	400	5	See	" "	
1	5 52	1.23	6.32	10	5	400	5	See	" "	
1	5 53	1.21	6.21	10	5	400	5	See	" "	
1	5 54	1.22	6.26	10	5	400	5	See	" "	
1	5 55	1.20	6.16	10	5	400	5	See	" "	Excellent measures.
7	5 19	1.12	5.85	10	5	400	5	See	" "	
7	5 20	1.11	5.80	10	5	400	5	See	" "	
7	5 21	1.10	5.75	10	5	400	5	See	" "	
7	5 22	1.14	5.96	10	5	400	5	See	" "	
7	5 23	1.14	5.96	10	5	400	5	See	" "	
7	5 24	1.09	5.70	10	5	400	5	See	" "	
7	5 25	1.16	6.06	10	5	400	5	See	" "	
7	5 26	1.10	5.75	10	5	400	5	See	" "	
7	5 27	1.14	5.96	10	5	400	5	See	" "	
7	5 28	1.12	5.85	10	5	400	5	See	" "	Excellent measures Oct. 7.
8	5 0	1.17	6.13	10	5	400	5	See	" "	Perfect seeing.
8	5 1	1.17	6.13	10	5	400	5	See	" "	
8	5 2	1.14	5.97	10	5	400	5	See	" "	
8	5 3	1.10	5.76	10	5	400	5	See	" "	
8	5 4	1.10	5.76	10	5	400	5	See	" "	Magnificent image.
8	5 5	1.13	5.92	10	5	400	5	See	" "	
8	5 6	1.17	6.13	10	5	400	5	See	" "	
8	5 7	1.16	6.08	10	5	400	5	See	" "	
8	5 8	1.14	5.97	10	5	400	5	See	" "	
8	5 8	1.17	6.13	10	5	400	5	See	" "	Excellent measures Oct. 8; image round; no irradiation.
8	5 9	1.17	6.13	10	5	400	5	See	" "	
10	5 24	1.12	5.90	10	5	400	5	See	" "	Irradiation of Sat. IV estimated as one-fourth that of Jupiter.
10	5 25	1.16	6.12	10	5	400	5	See	" "	
10	5 26	1.17	6.17	10	5	400	5	See	" "	
10	5 27	1.16	6.12	10	5	400	5	See	" "	
10	5 28	1.17	6.17	10	5	400	5	See	" "	
10	5 29	1.16	6.12	10	5	400	5	See	" "	Excellent measures on Oct. 10.

From September 6 to October 10, 1901, inclusive, the observations were made in daylight.

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DIAMETER OF SATURN.

EQUATORIAL.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"	"		"	"						
Apr. 7	16 45	16.70	0.04	0.01	10	16.75	164.1	4	...!	1	See	26-inch	Divisions in the ring clearly seen.
14	16 30	17.32	0.03	0.01	10	17.36	168.1	4–5	400	2	See	" "	
May 5	16 27	17.64	0.02	0.01	5	17.67	165.8	3	888	3	See	" "	Limb quite good; seeing suddenly became bad.
12	15 15	17.71	0.02	0.01	10	17.74	165.0	4	888	1	See	" "	
17	14 53	17.80	0.02	0.01	9	17.83	164.8	3–4	888	3	See	" "	
June 4	12 28	18.02	0.01	0.01	10	18.04	164.2	3–4	400	1	See	" "	
5	12 40	18.77	0.01	0.01	10	18.79	171.0	3–4	888	1	See	" "	
7	12 42	18.14	0.01	0.01	10	18.16	165.1	4	888	1	See	" "	
July 2	10 18	18.19	0.01	0.01	10	18.21	165.1	4	600	3	See	" "	Good measures.
10	9 36	18.24	0.01	0.01	10	18.26	166.1	4	600	3	See	" "	
11	8 38	18.71	0.01	0.01	10	18.73	170.4	4	888	3	See	" "	
11	9 56	18.68	0.01	0.01	10	18.70	170.2	4	888	3	See	" "	
11	10 7	18.57	0.01	0.01	10	18.59	169.2	4	600	3	See	" "	
13	9 58	18.15	0.01	0.01	10	18.17	165.6	3–4	600	2	See	" "	
14	9 28	18.48	0.01	0.01	10	18.50	168.7	4–5	600	2	See	" "	Very steady.
15	9 34	18.59	0.01	0.01	10	18.61	169.8	4	600	2	See	" "	
16	10 0	17.86	0.01	0.01	10	17.88	163.3	2–3	600	2	See	" "	Excellent measures; limb absolutely sharp and quiescent.
27	9 22	17.94	0.01	0.01	10	17.96	165.6	4–5	600	2	See	" "	Seeing almost perfect.
27	9 39	18.03	0.01	0.01	10	18.05	166.4	5	888	2	See	" "	
30	8 54	18.18	0.02	0.01	10	18.21	168.5	3–4	600	2	See	" "	
31	8 42	17.77	0.02	0.01	10	17.80	164.9	3	600	2	See	" "	
Aug. 2	8 32	17.87	0.02	0.01	10	17.90	166.2	4	400	2	See	" "	
3	9 2	18.11	0.02	0.01	10	18.14	168.6	3	888	2	See	" "	Unsteady, of doubtful value.
4	8 11	17.93	0.02	0.01	10	17.96	167.1	4	600	2	See	" "	
4	9 12	17.74	0.02	0.01	10	17.77	165.4	4	888	2	See	" "	Focus adjusted previous to this measure.
5	8 16	18.04	0.02	0.01	10	18.07	168.4	4	600	2	See	" "	
17	8 20	17.33	0.03	0.01	10	17.37	164.5	3–4	400	2	See	" "	
17	8 53	17.51	0.03	0.01	10	17.55	166.2	5	600	2	See	" "	
17	8 58	17.54	0.03	0.01	10	17.58	166.4	5	600	2	See	" "	
17	9 25	17.27	0.03	0.01	10	17.31	163.9	4	600	2	See	" "	
25	8 0	16.80	0.03	0.00	10	16.83	161.3	4–5	600	3	See	" "	
25	9 15	17.32	0.03	0.01	10	17.36	166.3	4–5	600	3	See	" "	
28	7 59	17.37	0.04	0.00	10	17.41	167.7	3–4	600	3	See	" "	
30	8 28	17.12	0.04	0.01	10	17.17	165.9	3–4	400	3	See	" "	
31	8 29	17.30	0.04	0.01	10	17.35	167.9	4	400	3	See	" "	
Sept. 1	7 54	17.16	0.04	0.01	10	17.21	166.8	4	400	3	See	" "	
1	8 11	16.92	0.04	0.01	10	16.97	164.5	4	400	3	See	" "	
2	7 26	17.16	0.04	0.00	10	17.20	166.9	4	400	3	See	" "	
2	7 46	17.13	0.04	0.00	10	17.17	166.6	4	400	3	See	" "	Good measures.
1901													
Sept. 21	5 50	16.78	0.04	0.01	10	16.83	165.0	5	400	4	See	26-inch	Planet sharp at limb; irradiation wholly insensible.
21	5 55	16.75	0.04	0.01	10	16.80	164.7	5	400	4	See	" "	
21	5 59	16.83	0.04	0.01	10	16.88	165.5	5	600	4	See	" "	
21	6 2	16.67	0.04	0.01	10	16.72	164.0	5	600	4	See	" "	Excellent measures.
22	5 57	16.72	0.04	0.01	10	16.77	164.7	5	400	4	See	" "	
22	6 4	16.77	0.04	0.01	10	16.82	165.2	5	400	4	See	" "	
23	5 46	16.31	0.04	0.01	10	16.36	161.0	5	400	5	See	" "	Saturn very faint.
23	5 48	16.66	0.04	0.01	9	16.71	164.4	5	400	5	See	" "	
23	5 51	16.57	0.04	0.01	10	16.62	163.5	5	400	5	See	" "	
23	5 53	16.70	0.04	0.01	10	16.75	164.8	5	400	5	See	" "	

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DIAMETER OF SATURN—Continued.

EQUATORIAL—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"		"	"						
Sept. 23	5 56	16.56	0.04	0.01	10	16.61	163.4	5	400	5	See	26-inch	Excellent measures on Sept. 23.
23	6 1	16.70	0.04	0.01	10	16.75	164.8	5	400	5	See	" "	Irradiation wholly insensible.
24	5 42	16.31	0.04	0.01	10	16.36	161.2	5	400	5	See	" "	Planet faint but sharp at limb.
24	5 46	16.55	0.04	0.01	10	16.60	163.6	5	400	5	See	" "	
24	5 51	16.58	0.04	0.01	10	16.63	163.9	5	400	5	See	" "	
24	5 56	16.52	0.04	0.01	10	16.57	163.3	5	400	5	See	" "	Excellent measures on Sept. 24.
24	6 2	16.72	0.04	0.01	10	16.77	165.2	5	400	5	See	" "	Slight irradiation at each limb, perhaps 0".1.
25	6 12	16.95	0.04	0.01	10	17.00	167.8	5	400	5	See	" "	Images quiet.
25	6 14	16.98	0.04	0.01	10	17.03	168.1	5	400	5	See	" "	
25	6 17	17.04	0.04	0.01	10	17.09	168.7	5	400	5	See	" "	Not yet perfectly dark; planet bright.
Oct. 1	6 4	16.96	0.04	0.01	10	17.01	169.6	5	400	5	See	" "	Not quite dark; planet quite bright.
1	6 6	16.94	0.04	0.01	10	16.99	169.4	5	400	5	See	" "	
1	6 9	16.99	0.04	0.01	10	17.04	169.9	5	400	5	See	" "	
1	6 11	16.89	0.04	0.01	10	16.94	168.9	5	400	5	See	" "	
1	6 14	16.96	0.04	0.01	10	17.01	169.6	5	400	5	See	" "	Excellent measures on Oct. 1.
6	5 26	16.23	0.04	0.00	10	16.27	163.5	5	400	5	See	" "	
6	5 27	16.26	0.04	0.00	10	16.30	163.8	5	400	5	See	" "	
6	5 29	16.26	0.04	0.00	10	16.30	163.8	5	400	5	See	" "	
6	5 31	16.37	0.04	0.00	10	16.41	164.9	5	400	5	See	" "	Excellent measures.
6	5 33	16.38	0.04	0.00	10	16.42	165.0	5	400	5	See	" "	The middle ring is of the same brightness as the ball of Saturn; outer ring two-thirds as bright.
6	5 36	16.37	0.04	0.00	10	16.41	164.9	5	400	5	See	" "	
6	5 38	16.37	0.04	0.00	10	16.41	164.9	5	400	5	See	" "	
6	5 40	16.39	0.04	0.00	10	16.43	165.1	5	400	5	See	" "	
6	5 42	16.47	0.04	0.00	10	16.51	165.9	5	400	5	See	" "	Occasionally a little tremulous, but excellent measures Oct. 6; great care exercised not to measure too closely.
6	5 44	16.46	0.04	0.00	10	16.50	165.9	5	400	5	See	" "	
7	5 30	16.35	0.04	0.00	10	16.39	165.0	5	400	5	See	" "	
7	5 32	16.40	0.04	0.00	10	16.44	165.5	5	400	5	See	" "	
7	5 35	16.39	0.04	0.00	10	16.43	165.4	5	400	5	See	" "	
7	5 36	16.38	0.04	0.00	10	16.42	165.3	5	400	5	See	" "	
7	5 37	16.41	0.04	0.00	10	16.45	165.6	5	400	5	See	" "	
7	5 39	16.44	0.04	0.00	10	16.48	165.4	5	400	5	See	" "	If anything the diameter is too large.
7	5 40	16.39	0.04	0.00	10	16.43	165.9	5	400	5	See	" "	
7	5 41	16.41	0.04	0.00	10	16.45	165.6	5	400	5	See	" "	
7	5 43	16.44	0.04	0.00	10	16.48	165.9	5	400	5	See	" "	
7	5 44	16.40	0.04	0.00	10	16.44	165.5	5	400	5	See	" "	Diameters probably a little large.
8	5 20	16.26	0.04	0.00	10	16.30	164.4	5	400	5	See	" "	
8	5 21	16.28	0.04	0.00	10	16.32	164.5	5	400	5	See	" "	
8	5 22	16.25	0.04	0.00	10	16.29	164.2	5	400	5	See	" "	
8	5 23	16.27	0.04	0.00	10	16.31	164.4	5	400	5	See	" "	
8	5 24	16.25	0.04	0.00	10	16.29	164.3	5	400	5	See	" "	
8	5 25	16.32	0.04	0.00	10	16.36	165.0	5	400	5	See	" "	
8	5 26	16.29	0.04	0.00	10	16.33	164.7	5	400	5	See	" "	
8	5 27	16.32	0.04	0.00	10	16.36	165.0	5	400	5	See	" "	
8	5 28	16.26	0.04	0.00	10	16.30	164.4	5	400	5	See	" "	Conditions perfect.
8	5 30	16.32	0.04	0.00	10	16.36	165.0	5	400	5	See	" "	Thin clouds kept Saturn at uniform and just proper brightness.
8	6 55	16.76	0.04	0.00	10	16.80	169.4	5	400	5	See	" "	
8	6 57	16.74	0.04	0.00	10	16.78	169.2	5	400	5	See	" "	
8	6 59	16.74	0.04	0.00	10	16.78	169.2	5	400	5	See	" "	

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DIAMETER OF SATURN—Continued.

EQUATORIAL—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"		"	"						
Oct. 8	7 2	16.79	0.04	0.00	10	16.83	169.7	5	400	5	See	26-inch	Excellent measures.
8	7 4	16.75	0.04	0.00	10	16.79	169.3	5	400	5	See	" "	
10	5 35	16.26	0.04	0.00	10	16.30	164.9	5	400	5	See	" "	
10	5 37	16.25	0.04	0.00	10	16.29	164.8	5	400	5	See	" "	
10	5 40	16.30	0.04	0.00	10	16.34	165.3	5	400	5	See	" "	
10	5 43	16.30	0.04	0.00	10	16.34	165.3	5	400	5	See	" "	
10	5 46	16.30	0.04	0.00	10	16.34	165.3	5	400	5	See	" "	
10	6 4	16.89	0.04	0.00	10	16.93	171.3	5	600	5	See	" "	
10	6 5	16.87	0.04	0.00	10	16 91	171.1	5	600	5	See	" "	
10	6 7	16.85	0.04	0.00	10	16.89	170.9	5	600	5	See	" "	
11	5 23	16.18	0.04	0.00	10	16.22	164.4	5	400	5	See	" "	
11	5 25	16.18	0.04	0.00	10	16 22	164.4	5	400	5	See	" "	
11	5 26	16.16	0.04	0.00	10	16.20	164.2	5	400	5	See	" "	
11	5 28	16.14	0.04	0.00	10	16.18	164.0	5	400	5	See	" "	Image a little tremulous
11	5 29	16.15	0.04	0.00	10	16.19	164.1	5	400	5	See	" "	
11	5 30	16.19	0.04	0.00	10	16.23	164.5	5	400	5	See	" "	Splendid seeing.
11	5 32	16.16	0.04	0.00	10	16.20	164.2	5	400	5	See	" "	
11	5 34	16.13	0.04	0.00	10	16.17	163.9	5	400	5	See	" "	Excellent measures
11	5 36	16.21	0.04	0.00	10	16.25	164.7	5	400	5	See	" "	made with image a
11	5 38	16.23	0.04	0.00	10	16.27	164.9	5	400	5	See	" "	little on one side of the wires
11	6 0	16.76	0.04	0.00	10	16.80	170.2	5	400	5	See	" "	A little tremulous.
11	6 2	16.73	0.04	0.00	10	16.77	169.9	5	400	5	See	" "	
11	6 4	16.79	0.04	0.00	10	16.83	170.6	5	400	5	See	" "	
11	6 6	16.79	0.04	0.00	10	16.83	170.6	5	400	5	See	" "	
11	6 8	16.75	0.04	0.00	10	16.79	170.1	5	400	5	See	" "	Excellent measures.
15	5 6	15.97	0.04	0.00	10	16.01	163.3	4	400	5	See	" "	Seeing not so good as
15	5 8	15.94	0.04	0.00	10	15.98	163.0	4	400	5	See	" "	on previous nights.
15	5 9	15.94	0.04	0.00	10	15.98	163.0	4	400	5	See	" "	
15	5 11	15.94	0.04	0.00	10	15.98	163.0	4	400	5	See	" "	
15	5 12	15.94	0.04	0.00	10	15.98	163.0	4	400	5	See	" "	
15	5 14	15.95	0.04	0.00	10	15.99	163.1	4	400	5	See	" "	
15	5 16	15.91	0.04	0.00	10	15.95	162.7	4	400	5	See	" "	
15	5 18	15.99	0.04	0.00	10	16.03	163.5	4	400	5	See	" "	
15	5 20	15.96	0.04	0.00	10	16.00	163.2	4	400	5	See	" "	
15	5 23	16.02	0.04	0.00	10	16.06	163.8	4	400	5	See	" "	The limb is sometimes tremulous.
16	4 46	16.08	0.04	0.00	10	16.12	164.7	5	400	5	See	" "	Planet very faint.
16	4 48	16.04	0.04	0.00	10	16.08	164.3	5	400	5	See	" "	
16	4 51	16.07	0.04	0.00	10	16.11	164.6	5	400	5	See	" "	
16	4 52	16.09	0.04	0.00	10	16.13	164.8	5	400	5	See	" "	
16	4 54	16.04	0.04	0.00	10	16.08	164.3	5	400	5	See	" "	Excellent measures.
16	4 56	16.05	0.04	0.00	10	16.09	164.4	5	400	5	See	" "	
16	4 58	16 08	0.04	0.00	10	16.12	164.7	5	400	5	See	" "	
16	5 0	16 08	0.04	0.00	10	16.12	164.7	5	400	5	See	" "	
16	5 2	16 06	0.04	0.00	10	16.10	164.5	5	400	5	See	" "	Magnificent seeing.
16	5 4	16.05	0.04	0.00	10	16.09	164.4	5	400	5	See	" "	
16	5 7	16.09	0.04	0.00	10	16.13	164.8	5	400	5	See	" "	
16	5 8	16.06	0.04	0.00	10	16.10	164.5	5	400	5	See	" "	Excellent measures.
16	5 10	16.08	0.04	0.00	10	16.12	164.7	5	400	5	See	" "	
16	5 11	16 12	0.04	0.00	10	16 16	165.1	5	400	5	See	" "	
16	5 12	16 10	0.04	0.00	10	16.14	164.9	5	400	5	See	" "	
16	5 14	16.07	0.04	0.00	10	16.11	164.6	5	400	5	See	" "	

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DIAMETER OF SATURN—Continued.

EQUATORIAL—Continued.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DEF. ILL.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
						CORRECTED.	UNIT DISTANCE.						
1901	h m	"	"	"		"	"						
Oct. 16	5 15	16.07	0.04	0.00	10	16.11	164.6	5	400	5	See	26-inch	
16	5 16	16.09	0.04	0.00	10	16.13	164.8	5	400	5	See	" "	Magnificent seeing; planet of just the right brightness.
16	5 17	16.06	0.04	0.00	10	16.10	164.5	5	400	5	See	" "	
16	5 19	16.07	0.04	0.00	10	16.11	164.6	5	400	5	See	" "	
16	5 46	16.56	0.04	0.00	10	16.60	169.6	5	400	5	See	" "	Occasionally a little disturbed.
16	5 48	16.69	0.04	0.00	10	16.73	170.9	5	400	5	See	" "	
16	5 49	16.60	0.04	0.00	10	16.64	170.0	5	400	5	See	" "	
16	5 52	16.62	0.04	0.00	10	16.66	170.2	5	400	5	See	" "	
16	5 54	16.62	0.04	0.00	10	16.66	170.2	5	400	5	See	" "	
16	5 56	16.61	0.04	0.00	10	16.65	170.1	5	400	5	See	" "	
16	5 58	16.57	0.04	0.00	10	16.61	169.7	5	400	5	See	" "	Limb sharp.
16	6 2	16.57	0.04	0.00	10	16.61	169.7	5	400	5	See	" "	Excellent measures.
16	6 3	16.59	0.04	0.00	10	16.63	169.9	5	400	5	See	" "	
16	6 6	16.63	0.04	0.00	10	16.67	170.3	5	400	5	See	" "	Measures on the whole excellent.

The measures of the equatorial diameter of Saturn in 1901 were made in daylight with the exception of those on September 25, October 1, the last five on October 8, the last three on October 10, the last five on October 11, and the last ten on October 16.

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DIMENSIONS OF THE RINGS OF SATURN.

EXTERIOR DIAMETER OF OUTER RING.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"		"	"						
Apr 14	16 38	40.14	0.01	12	40.15	388.8	3-4	400	2	See	26-inch	
May 12	14 57	41.49	0.01	10	41.50	385.8	3-4	600	1	See	" "	Excellent measures.
June 4	12 24	42.36	0.01	10	42.37	385.7	3-4	400	1	See	" "	
7	12 38	42.13	0.01	10	42.14	383.1	4-5	888	1	See	" "	
July 2	10 35	42.57	0.01	10	42.58	386.0	4	600	3	See	" "	
10	9 42	42.10	0.01	10	42.11	383.1	4	600	3	See	" "	
11	8 46	42.39	0.01	10	42.40	385.9	4	600	3	See	" "	
13	10 12	42.13	0.01	10	42.14	384.1	3-4	600	2	See	" "	
14	9 47	41.71	0.01	10	41.72	380.5	4-5	600	2	See	" "	
15	9 39	42.21	0.01	10	42.22	385.3	4	600	2	See	" "	
16	9 51	42.14	0.01	10	42.15	384.9	2-3	600	2	See	" "	
27	9 0	41.41	0.01	10	41.42	382.0	4	600	2	See	" "	
28	9 58	41.50	0.01	10	41.51	383.2	3-4	600	2	See	" "	
30	8 50	41.03	0.01	10	41.04	379.7	3-4	600	2	See	" "	
31	9 14	41.99	0.01	10	42.00	389.0	3	888	2	See	" "	
Aug. 2	8 37	41.58	0.01	10	41.59	386.1	4	400	2	See	" "	
4	8 15	41.75	0.01	10	41.76	388.6	4	600	2	See	" "	
5	8 20	41.40	0.01	10	41.41	385.7	4	600	2	See	" "	
17	8 5	40.47	0.01	10	40.48	383.3	3-4	400	2	See	" "	
17	9 14	40.42	0.01	10	40.43	382.8	4-5	600	2	See	" "	
25	8 4	39.21	0.01	10	39.22	375.8	4	600	3	See	" "	
25	9 18	39.94	0.02	10	39.96	382.9	4-5	600	3	See	" "	
28	8 4	39.85	0.01	10	39.86	383.8	3-4	600	3	See	" "	
30	8 33	39.77	0.01	10	39.78	384.3	3-4	400	3	See	" "	
31	8 33	39.95	0.01	10	39.96	386.6	4	400	3	See	" "	
Sept 1	7 58	39.67	0.01	10	39.68	384.6	4	400	3	See	" "	
1	8 16	39.62	0.01	10	39.63	384.1	4	400	3	See	" "	
2	7 32	39.86	0.01	10	39.87	386.9	3	400	3	See	" "	
1901												
Oct. 6	5 46	38.04	0.01	10	38.05	382.5	4-5	400	5	See	26-inch	Good measures; no sensible irradiation.
7	5 46	38.13	0.01	10	38.14	384.0	5	400	5	See	" "	Irradiation of outer ring one-half that of ball of Saturn.
8	5 33	37.81	0.01	10	37.82	381.3	5	400	5	See	" "	
8	5 34	37.81	0.01	10	37.82	381.3	5	400	5	See	" "	
8	5 35	37.80	0.01	10	37.81	381.2	5	400	5	See	" "	
8	5 36	37.79	0.01	10	37.80	381.2	5	400	5	See	" "	
8	5 37	37.79	0.01	10	37.80	381.2	5	400	5	See	" "	Seeing perfect; excellent measures.
16	5 23	37.20	0.01	10	37.21	380.2	5	400	5	See	" "	Used outside of wires for measuring; a correction of 0".25 has been applied on this night for diameter of wires.
16	5 25	37.31	0.01	10	37.32	381.2	5	400	5	See	" "	
16	5 28	37.27	0.01	10	37.28	380.9	5	400	5	See	" "	
16	5 29	37.33	0.01	10	37.34	381.5	5	400	5	See	" "	
16	5 31	37.37	0.01	10	37.38	381.9	5	400	5	See	" "	
16	5 32	37.42	0.01	10	37.43	382.4	5	400	5	See	" "	Seeing a little blurred, can not see edge of ring with perfect sharpness.

From October 6 to October 16, 1901, inclusive, the observations were made in daylight.

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DIMENSIONS OF THE RINGS OF SATURN—Continued.

INTERIOR DIAMETER OF OUTER RING OR EXTERIOR DIAMETER OF CASSINI'S DIVISION.

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
					CORRECTED. / UNIT DISTANCE.						
1900	h m	"	"		" / "						
Apr. 14	16 48	34.51	0.01	10	34.52 / 334.3	3-4	400	2	See	26-inch	
May 12	15 8	35.79	0.01	10	35.80 / 332.9	4	600	1	See	" "	
June 7	12 34	36.46	0.01	10	36.47 / 331.5	4-5	888	1	See	" "	
July 2	10 40	36.56	0.01	10	36.57 / 331.5	4	600	3	See	" "	
10	9 49	36.64	0.01	10	36.65 / 333.4	4	600	3	See	" "	
11	8 54	36.61	0.01	10	36.62 / 333.3	4	600	3	See	" "	
13	10 36	36.53	0.01	10	36.54 / 333.0	3-4	600	2	See	" "	
14	9 53	36.43	0.01	10	36.44 / 332.4	4-5	600	2	See	" "	
15	9 44	36.51	0.01	10	36.52 / 333.3	4	600	2	See	" "	
16	10 5	36.22	0.01	10	36.23 / 330.9	3	600	2	See	" "	
27	9 5	35.77	0.01	10	35.78 / 329.9	4	600	2	See	" "	
30	9 0	35.79	0.01	10	35.80 / 331.2	3-4	600	2	See	" "	
31	9 23	35.83	0.01	10	35.84 / 332.0	3	888	2	See	" "	
Aug. 2	8 42	35.45	0.01	10	35.46 / 329.2	4	400	2	See	" "	
4	8 20	35.61	0.01	10	35.62 / 331.4	4	600	2	See	" "	
5	8 26	35.62	0.01	10	35.63 / 331.9	4	600	2	See	" "	
17	8 10	34.78	0.01	10	34.79 / 329.5	3-4	400	2	See	" "	
17	9 10	34.86	0.01	10	34.87 / 330.2	4-5	600	2	See	" "	
25	8 8	34.39	0.01	10	34.40 / 329.7	3-4	600	3	See	" "	
25	9 23	34.58	0.01	10	34.59 / 331.4	4-5	600	3	See	" "	
28	8 7	34.25	0.01	10	34.26 / 329.9	3-4	600	3	See	" "	
30	8 38	34.37	0.01	10	34.38 / 332.1	3-4	400	3	See	" "	
31	8 40	34.43	0.01	10	34.44 / 333.3	4	400	3	See	" "	
Sept. 1	8 3	34.27	0.01	10	34.28 / 332.2	4	400	3	See	" "	
2	7 37	34.17	0.01	10	34.18 / 331.7	4	400	3	See	" "	

EXTERIOR DIAMETER OF DUSKY RING OR INTERIOR DIAMETER OF CENTRAL RING.

1900											
Apr. 14	17 0	25.97	0.01	10	25.98	251.5	3-4	600	2	See	26-inch	
June 5	12 46	28.90	0.01	10	28.91	263.0	3-4	888	1	See	" "	Power too high; not very satisfactory measures.
7	12 46	27.41	0.01	10	27.42	249.3	4-5	888	1	See	" "	
July 2	10 23	27.69	0.01	10	27.70	251.1	4	600	3	See	" "	
10	9 54	27.64	0.01	10	27.65	251.5	4	600	3	See	" "	
11	9 3	28.20	0.01	10	28.21	256.7	3-4	600	3	See	" "	
13	10 20	27.10	0.01	10	27.11	247.1	3-4	600	2	See	" "	
15	9 49	26.90	0.01	10	26.91	245.6	4	600	2	See	" "	
16	9 56	27.27	0.01	10	27.28	249.1	2-3	600	2	See	" "	
27	9 16	26.43	0.01	10	26.44	243.8	4-5	600	2	See	" "	
30	9 4	26.23	0.01	10	26.24	242.8	3-4	600	2	See	" "	
31	9 20	26.63	0.01	10	26.64	246.7	3	888	2	See	" "	
Aug. 2	8 46	26.74	0.01	10	26.75	248.3	4	400	2	See	" "	
4	8 26	26.85	0.01	10	26.86	249.9	4	600	2	See	" "	
5	8 30	26.61	0.01	10	26.62	248.0	4	600	2	See	" "	
17	8 13	26.22	0.01	10	26.23	248.4	3-4	400	2	See	" "	
17	9 8	25.90	0.01	10	25.91	245.4	4-5	600	2	See	" "	
25	8 12	25.42	0.01	10	25.43	243.7	2-3	600	3	See	" "	Hazy and blurred.

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DIMENSIONS OF THE RINGS OF SATURN—Continued.

EXTERIOR DIAMETER OF DUSKY RING OR INTERIOR DIAMETER OF CENTRAL RING—Continued

DATE.	WASHINGTON MEAN TIME.	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS
					CORRECTED.	UNIT DISTANCE.						
1900	h m	"	"		"	"						
Aug. 25	9 27	25.46	0.01	10	25.47	244.1	4	600	3	See	26-inch	
28	8 11	26.09	0.01	10	26.10	251.3	2–3	600	3	See	" "	Seeing became bad
30	8 42	25.48	0.01	10	25.49	246.3	3–4	400	3	See	" "	
31	8 41	25.43	0.01	10	25.44	246.2	4	400	3	See	" "	
Sept. 1	8 6	25.22	0.01	10	25.23	244.5	4	400	3	See	" "	
2	7 42	25.32	0.01	10	25.33	245.8	4	400	3	See	" "	
1901												
Oct. 8	5 38	24.52	0.01	10	24.53	247.3	5	400	5	See	26-inch	
8	5 40	24.51	0.01	10	24.52	247.2	5	400	5	See	" "	
8	5 41	24.49	0.01	10	24.50	247.1	5	400	5	See	" "	
8	5 43	24.45	0.01	10	24.46	246.7	5	400	5	See	" "	Perfect seeing excellent measures
8	5 44	24.50	0.01	10	24.51	247.1	5	400	5	See	" "	

October 8, 1901, the observations were made in daylight.

DIAMETER OF THE CENTER OF ENCKE'S DIVISION.

DATE.	WASHINGTON MEAN TIME	MEASURED DIAMETER.	DIFF. REFR.	NUMBER OF SETTINGS	DIAMETER		SEEING.	POWER.	COLOR CELL.	OBS'R	INSTRUMENT.	REMARKS
					CORRECTED.	UNIT DISTANCE						
1900	h m	"	"		"	"						
June 7	12 55	39.46	0.01	10	39.47	358.8	4.5	888	1	See	26-inch	
July 2	10 48	39.65	0.01	10	39.66	359.6	4	600	3	See	" "	

DISTANCE FROM ENCKE'S DIVISION TO OUTER EDGE OF RING.

DATE.	WASHINGTON MEAN TIME.	DISTANCE		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R	INSTRUMENT.	REMARKS.
		MEASURED	UNIT DISTANCE.							
1900	h m	"	"							
July 27	9 10	0.70	6.5	10	4	600	2	See	26-inch	

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DIMENSIONS OF THE RINGS OF SATURN—Continued.

TOTAL WIDTH OF OUTER RING.

DATE.	WASHINGTON MEAN TIME.	WIDTH		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
July 14	9 40	2.92	26.6	10	4–5	600	2	See	26-inch	

WIDTH OF DUSKY RING.

1900	h m	"	"							
June 4	12 38	2.80	25.5	10	3–4	400	1	See	26-inch	Dusky ring extends two-thirds the way to the planet.
7	12 51	2.64	24.0	10	4–5	888	1	See	" "	
July 2	10 27	2.78	25.2	10	4	600	3	See	" "	
10	9 57	2.65	24.1	10	4	600	3	See	" "	
11	9 7	2.83	25.8	10	3–4	600	3	See	" "	Cassini's division seen all around the planet.
13	10 24	2.50	22.8	10	3–4	600	2	See	" "	
14	9 34	2.91	26.5	10	4–5	600	2	See	" "	
15	9 53	2.66	24.3	10	4	600	2	See	" "	
16	10 9	2.82	25.8	10	3	600	2	See	" "	
27	9 13	2.51	23.1	10	4–5	600	2	See	" "	Dusky ring extends sharply three-fifths of way to planet.
27	9 28	2.46	22.7	10	4–5	600	2	See	" "	Measured on left side.
30	9 7	2.38	22.0	10	3–4	600	2	See	" "	
31	9 26	2.45	22.7	10	3	888	2	See	" "	
Aug. 2	8 49	2.40	22.3	10	4	400	2	See	" "	Measured on left side; dusky ring extends two-thirds way to planet on left and almost touches it.
4	8 29	2.40	22.3	10	2–3	600	2	See	" "	Measured on the left; Encke's division divides the outer ring in the ratio 7:8.
5	8 35	2.66	24.8	10	4	600	2	See	" "	
17	8 16	2.53	24.0	10	3–4	400	2	See	" "	
17	9 2	2.98	28.2	10	5	600	2	See	" "	Measured on the left side; the ring occupies over two-thirds the space between outer rings and Saturn.
25	8 14	2.91	27.9	10	2–3	600	3	See	" "	
25	9 29	2.73	26.2	10	4	600	3	See	" "	Measured on the left side.
1901										
May 15	15 36	2.84	26.7	10	5	600	4	See	26-inch	Ring almost touches Saturn; estimated to fill three-fourths of the space; a little space next to globe perfectly black.
June 27	13 5	2.87	26.0	11	5	400	4	See	" "	Measured on left side; dusky ring certainly occupies seven-tenths of the space next to the planet.
27	13 16	2.91	26.3	10	5	400	4	See	" "	Magnificent seeing; Saturn is sharp, like an engraving.
28	11 59	3.01	27.2	10	5	400	4	See	" "	Measured on the left side.
30	11 22	2.89	26.1	10	2–3	400	4	See	" "	Measured on the left side.
July 21	10 47	2.84	25.8	10	4–5	400	4	See	" "	Measured on the left side; splendid definition; excellent measures.
Aug. 7	9 45	2.83	26.0	10	5	400	4	See	" "	Measured on left side; dusky ring occupies fully one-half of the space and fades away gradually on inner edge.

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DIMENSIONS OF THE RINGS OF SATURN—Continued.

WIDTH OF CASSINI'S DIVISION.

DATE.	WASHINGTON MEAN TIME.	WIDTH		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Apr. 14	16 55	0.49	4.7	6	2–3	600	2	See	26-inch	Estimated width 0".45.
May 12	15 19	0.42	3.9	10	4	888	1	See	" "	Estimated width of Encke's division 0".12.
June 4	12 36	0.24	2.2	10	3–4	400	1	See	" "	Estimated width 0".42; estimated width of Encke's division 0".1.
7	12 29	0.28	2.5	10	4–5	888	1	See	" "	Estimated width of Encke's division 0".1; very exact.
July 2	10 43	0.35	3.2	10	4	600	3	See	" "	Width of Encke's division equals 0".13; two settings.
10	10 0	0.40	3.6	10	3–4	600	3	See	" "	
11	8 58	0.40	3.6	10	4	600	3	See	" "	Estimated width of Encke's division 0".10.
13	10 29	0.40	3.6	10	3–4	600	2	See	" "	
14	9 31	0.48	4.4	10	4–5	600	2	See	" "	Encke's division estimated as one-fifth
15	9 55	0.40	3.7	10	4	600	2	See	" "	width of Cassini's; seen as a fine line almost around and in the center of the outer ring.
16	10 11	0.42	3.8	10	3	600	2	See	" "	
27	9 31	0.42	3.9	10	4–5	600	2	See	" "	Estimated width of Encke's division one-fourth of Cassini's.
30	9 9	0.44	4.1	10	3	600	2	See	" "	Estimated width of Encke's division one-fifth of Cassini's.
31	9 27	0.45	4.2	10	3–4	888	2	See	" "	Estimated width of Encke's division one-fourth of Cassini's.
Aug. 2	8 51	0.49	4.6	10	4	400	2	See	" "	Estimated width of Encke's division one-fourth of Cassini's.
4	8 23	0.46	4.3	10	4	600	2	See	" "	Estimated width of Encke's division one-
4	9 15	0.41	3.8	10	4	888	2	See	" "	fourth of Cassini's.
5	8 37	0.55	5.1	10	2	600	2	See	" "	
17	8 23	0.51	4.8	10	3–4	400	2	See	" "	Estimated width of Encke's division one-
17	9 17	0.48	4.5	10	3	600	2	See	" "	fourth of Cassini's.
25	8 48	0.39	3.7	10	4	600	3	See	" "	Encke's division is distant from outer and inner edges of ring as 7:8.
25	9 31	0.42	4.0	10	5	600	3	See	" "	Estimated width of Encke's division one-fifth of Cassini's, and is seven-fifteenths from outer edge to Cassini's division.

POSITION ANGLE OF THE RING.

DATE.	WASHINGTON MEAN TIME.	POSITION ANGLE.	NUMBER OF SETTINGS	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1900	h m	°						
July 11	10 3	97.02	5	4	888	See	26-inch	
13	10 4	96.81	5	3–4	600	See	" "	
14	10 ..	96.80	5	4–5	600	See	" "	
15	9 58	97.28	5	4	600	See	" "	
16	9 46	97.54	6	3–2	600	See	" "	
27	8 56	97.02	5	4	600	See	" "	
28	8 54	97.30	5	3	600	See	" "	
30	8 46	96.94	5	3–4	600	See	" "	

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DIAMETERS OF THE SATELLITES OF SATURN.

DIAMETER OF TITAN.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
May 12	15 29	0.39	3.6	10	4	888	1	See	26-inch	
July 2	10 31	0.77	7.0	10	4	600	3	See	" "	
10	10 4	0.59	5.4	10	3–4	600	3	See	" "	
11	8 33	0.44	4.0	10	4	888	3	See	" "	
11	9 50	0.42	3.8	10	4	888	3	See	" "	
14	10 2	0.41	3.7	8	4	600	2	See	" "	Estimated diameter, 0".5.
15	10 0	0.45 ±	4.1 ±	..	4	600	2	See	" "	Estimated.
27	9 46	0.39	3.6	10	4–5	888	2	See	" "	
30	9 12	0.43	4.0	4	3	600	2	See	" "	Exactly equal to width of Cassini's division.
Aug. 17	8 27	0.68	6.4	6	3–4	400	2	See	" "	Estimated to be one-fifth wider than Cassini's division.
17	9 20	0.60	5.7	6	4	600	2	See	" "	Excellent measures; dark wires.
25	8 45	0.49	4.7	10	3–4	600	3	See	" "	
1901										
May 15	15 12	0.71	6.7	10	4	600	4	See	26-inch	
15	15 16	0.59	5.5	10	4	600	4	See	" "	
June 18	13 44	0.74	6.7	10	3–4	600	4	See	" "	
27	13 11	0.87	7.9	10	5	400	4	See	" "	
27	13 14	0.88	8.0	10	5	400	4	See	" "	Excellent measures.
28	12 30	0.86	7.8	10	5	600	4	See	" "	
28	12 32	0.89	8.1	10	5	888	4	See	" "	Disk perfectly round; no visible markings.
30	11 24	0.89	8.0	10	5	400	4	See	" "	Excellent measures.
July 15	11 28	0.81	7.3	10	4	400	4	See	" "	
20	10 58	1.13	10.3	10	4	400	4	See	" "	Fairly good measures.
20	11 1	1.06	9.6	10	4	400	4	See	" "	
21	10 41	1.07	9.7	10	4	400	4	See	" "	Excellent measures; irradiation estimated 0".25.
Aug. 7	9 58	1.05	9.7	10	5	400	4	See	" "	Dark wires.
7	10 3	1.02	9.4	10	5	400	4	See	" "	
9	10 ..	1.11	10.2	10	4	400	4	See	" "	
20	9 36	0.89	8.3	10	4–5	600	4	See	" "	Good measures.
29	8 52	0.84	7.9	10	4	600	4	See	" "	Dark wires; image very good, but does not appear quite as large as usual; estimated diameter 0".8.
29	8 55	0.90	8.5	10	4	600	4	See	" "	
29	9 2	0.82	7.8	10	4	888	4	See	" "	
Oct. 10	5 49	0.69	7.1	10	5	400	5	See	" "	About same size as Sat. II of Jupiter, but fainter; resembles Sat. IV of Jupiter in brightness.
10	5 50	0.70	7.1	10	5	400	5	See	" "	
10	5 51	0.70	7.1	10	5	400	5	See	" "	
10	5 53	0.70	7.1	10	5	400	5	See	" "	
10	5 54	0.73	7.4	10	5	400	5	See	" "	Excellent measures on Oct. 10.
11	5 41	0.64	6.5	10	5	400	5	See	" "	
11	5 42	0.64	6.5	10	5	400	5	See	" "	
11	5 44	0.66	6.7	10	5	400	5	See	" "	
11	5 46	0.68	6.9	10	5	400	5	See	" "	
11	5 47	0.67	6.8	10	5	400	5	See	" "	Excellent measures.
11	5 48	0.74	7.5	10	5	400	5	See	" "	In the last two measures the satellite was brighter and the limb sharper.
11	5 50	0.73	7.4	10	5	400	5	See	" "	
15	5 36	0.67	6.8	10	4	400	5	See	" "	
15	5 37	0.68	6.9	10	4	400	5	See	" "	
15	5 38	0.67	6.8	10	4	400	5	See	" "	
15	5 39	0.67	6.8	10	4	400	5	See	" "	
15	5 40	0.68	6.9	10	4	400	5	See	" "	Excellent measures.
16	5 38	0.68	6.9	10	5	400	5	See	" "	
16	5 39	0.65	6.6	10	5	400	5	See	" "	
16	5 40	0.71	7.2	10	5	400	5	See	" "	
16	5 41	0.66	6.7	10	5	400	5	See	" "	
16	5 42	0.69	7.0	10	5	400	5	See	" "	Excellent measures.

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DIAMETERS OF THE SATELLITES OF SATURN—Continued.

DIAMETER OF JAPETUS.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS.	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
May 15	15 25	0.37	3.5	4	4	888	4	See	26-inch	Japetus has an excessively small disk; estimated diameter 0".30.
Aug. 7	10 56	0.30	2.8	10	4–5	600	4	See	" "	Estimated diameter 0".35; fully twice the thickness of the wires.
9	11 ..	0.40±	3.7±	..	4	400	4	See	" "	Estimated.
Oct. 10	6 ..	0.18±	1.8±	..	5	600	5	See	" "	Estimated; Japetus has small disk.
11	6 ..	0.20±	2.0±	..	5	...	..	See	" "	Estimated; no color cell recorded.
16	6 ..	0.20±	2.0±	..	5	...	..	See	" "	Estimated; no color cell recorded.

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DIAMETER OF URANUS.

0°–180°

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF MEASURES.	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Apr. 7	15 55	3.01	55.4	10	2	600	2	See	26-inch	Hazy.
14	15 48	3.61	66.1	10	4–3	888	2	See	" "	
May 12	13 18	3.74	67.6	10	3–4	600	1	See	" "	Limb perfectly sharp; disk absolutely round; no markings of any kind.
12	13 33	3.39	61.2	10	3–4	888	1	See	" "	
17	13 0	3.57	64.4	10	4–5	888	3	See	" "	Absolutely round; no markings of any kind.
21	13 44	3.50	63.1	10	4	600	1	See	" "	
June 5	11 26	3.54	63.8	10	4–5	888	1	See	" "	Disk perfectly round, but fuzzy.
6	11 44	3.35	60.3	10	4–5	888	1	See	" "	Disk perfectly round; no markings.
7	12 22	3.34	60.2	10	4–5	888	1	See	" "	
23	10 44	3.54	64.0	10	4	888	1	See	" "	
July 1	9 25	3.41	61.9	10	4	888	3	See	" "	
2	9 45	3.50	63.6	10	3	888	1	See	" "	
10	9 12	3.48	63.4	10	3–4	888	3	See	" "	
11	8 16	3.48	63.5	10	4	888	3	See	" "	
13	9 38	3.44	62.8	10	3–4	600	2	See	" "	
14	9 2	3.49	63.8	10	4	600	2	See	" "	
14	9 14	3.49	63.8	10	4–5	888	2	See	" "	Disk perfectly round; sharp at limb.
15	8 52	3.40	62.2	10	5	888	2	See	" "	Limb absolutely sharp and disk round.
15	8 58	3.41	62.4	10	5	888	2	See	" "	
16	9 42	3.50	64.0	10	3–2	888	2	See	" "	Blurred and unsteady.
Aug. 25	7 30	3.36	63.5	10	5	888	3	See	" "	Excellent measures.
1901										
May 14	13 40	3.60	65.3	10	4	600	4	See	26-inch	Disk absolutely round; no markings.
15	13 20	3.61	65.5	10	4	600	4	See	" "	Disk round; well defined; no markings of any kind.
23	13 8	3.91	70.8	10	4	600	4	See	" "	
June 3	11 14	3.55	64.2	10	3	600	4	See	" "	Hazy.
4	12 8	3.66	66.1	10	4	600	4	See	" "	
18	11 38	3.43	62.1	10	3–4	600	4	See	" "	Irradiation of limb quite sensible.
19	10 44	3.42	61.9	10	3–4	600	4	See	" "	Sky thick and disk faint.
19	10 53	3.65	66.1	10	3–4	600	4	See	" "	
27	10 28	3.53	64.0	10	4	600	4	See	" "	Fuzzy.
27	10 32	3.63	65.9	10	4	600	4	See	" "	Very good measures.
July 9	10 12	3.42	62.4	10	3	600	4	See	" "	
15	7 54	3.59	65.7	10	4	600	4	See	" "	Disk perfectly round; no elongation.
15	9 22	3.53	64.6	10	4	600	4	See	" "	
21	9 20	3.51	64.5	10	4	600	4	See	" "	Disk absolutely round; no markings.
23	8 20	3.62	66.6	10	4–5	600	4	See	" "	Very good measures; disk absolutely round; no markings.
31	7 54	3.67	67.9	10	3	600	4	See	" "	Limb hazy.
Aug. 20	7 10	3.55	66.7	10	4–5	600	4	See	" "	Excellent measures; irradiation quite sensible; limb quite sharp; disk absolutely round; no markings.
20	7 22	3.56	66.9	10	4–5	600	4	See	" "	
22	7 28	3.57	67.2	10	3	600	4	See	" "	
28	7 30	3.53	66.8	10	4–5	600	4	See	" "	Irradiation perhaps 0".20 at each limb.
29	7 56	3.63	68.8	10	4	600	4	See	" "	Disk perfectly round; irradiation perhaps 0".20 at each limb.
30	7 14	3.61	68.5	10	3–4	600	4	See	" "	Irradiation estimated at 0".18 at each limb.
1902										
June 1	13 34	3.86	70.1	10	5	600	..	See	26-inch	Excellent measures; no color cell recorded.
Aug. 29	6 37	2.98	56.4	10	5	600	4	See	" "	Image perfectly round; limb sharp.

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DIAMETER OF URANUS—Continued.

90°–270°

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF MEASURES.	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1900	h m	"	"							
Mar. 31	14 ..	3.36	62.2	10	2–3	600	3	See	26-inch	Image blurred.
Apr. 7	15 55	3.34	61.5	20	2	600	2	See	" "	
14	15 48	3.62	66.3	10	4–3	888	2	See	" "	
26	13 47	3.37	61.3	10	4	888	3	See	" "	Diameter in position angle 30° apparently a little longer than in 120°.
May 12	13 18	3.47	62.7	10	3–4	600	1	See	" "	
12	13 33	3.46	62.5	10	3–4	888	1	See	" "	
17	13 0	3.60	64.9	10	4–5	888	3	See	" "	
21	13 44	3.53	63.6	10	4	600	1	See	" "	
June 4	11 40	3.28	59.1	10	2–4	888	1	See	" "	Fuzzy; disk perfectly round.
5	11 20	3.51	63.2	10	4–5	888	1	See	" "	No markings; a little fuzzy on the edges, but on the whole quite sharp; excellent measures.
6	11 40	3.44	62.0	10	4–5	888	1	See	" "	
7	12 16	3.32	59.8	10	4–5	888	1	See	" "	
8	11 30	3.54	63.8	5	3–4	888	1	See	" "	Seeing too unsteady to continue.
20	10 48	3.29	59.4	10	2	888	1	See	" "	
23	10 41	3.57	64.6	20	4	888	1	See	" "	
July 1	9 18	3.56	64.6	10	4	888	3	See	" "	
2	9 41	3.66	66.5	10	3	888	1	See	" "	
10	9 8	3.46	63.1	10	3–4	888	3	See	" "	
11	8 19	3.58	65.3	10	4	888	3	See	" "	
13	9 30	3.60	65.8	10	3–4	600	2	See	" "	
14	9 0	3.65	66.7	10	4	600	2	See	" "	
14	9 9	3.49	63.8	10	4–5	888	2	See	" "	
15	8 46	3.62	66.2	10	5	888	2	See	" "	
15	9 2	3.54	64.7	10	4	888	2	See	" "	
16	9 38	3.68	67.3	10	3–2	888	2	See	" "	
Aug. 25	7 26	3.34	63.1	10	5	888	3	See	" "	
1901										
May 14	13 38	3.61	65.5	10	4	600	4	See	26-inch	
15	13 16	3.59	65.1	10	4	600	4	See	" "	
23	13 4	3.84	69.5	10	4	600	4	See	" "	
June 3	11 10	3.56	64.3	11	3	600	4	See	" "	Hazy.
4	12 6	3.74	67.6	10	4	600	4	See	" "	
18	11 34	3.63	65.7	10	3–4	600	4	See	" "	
19	10 39	3.50	63.4	10	3–4	600	4	See	" "	
19	10 58	3.73	67.5	10	3–4	600	4	See	" "	
24	11 34	3.76	68.2	10	2–3	600	4	See	" "	
27	10 24	3.60	65.3	10	4	600	4	See	" "	
27	10 36	3.66	66.4	10	4	600	4	See	" "	
July 9	10 10	3.42	62.4	10	3	600	4	See	" "	
15	7 50	3.58	65.5	10	4	600	4	See	" "	Seeing blurred at moments.
15	9 25	3.58	65.5	10	4	600	4	See	" "	
21	9 16	3.58	65.8	10	4	600	4	See	" "	
23	8 17	3.66	65.8	10	4–5	600	4	See	" "	
31	7 51	3.64	67.3	10	3	600	4	See	" "	
Aug. 8	7 2	2.98	55.5	10	4–5	600	4	See	" "	No irradiation; limb good.
8	7 8	3.23	60.1	10	4–5	600	4	See	" "	Irradiation insensible.
8	7 14	3.26	60.7	10	5	600	4	See	" "	Excellent measures; no sensible irradiation.
8	7 20	3.27	60.9	10	5	600	4	See	" "	Very slight irradiation, 0".05.
9	6 50	2.90	54.0	10	5	600	4	See	" "	

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DIAMETER OF URANUS—Continued.

90°–270°—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF MEASURES.	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
Aug. 9	6 53	3.19	59.4	10	5	600	4	See	26-inch	
9	6 55	3.12	58.1	10	5	600	4	See	" "	Excellent measures; no sensible irradiation.
9	6 56	3.21	59.8	10	5	600	4	See	" "	Excellent measures.
9	7 0	3.19	59.4	10	5	600	4	See	" "	Excellent measures; limb perfectly sharp.
9	7 2	3.23	60.2	10	5	600	4	See	" "	
9	7 24	3.58	66.7	10	4–5	600	4	See	" "	Disk absolutely round; excellent measures; irradiation very slight, perhaps o".05.
16	7 6	3.29	61.6	10	4–5	600	4	See	" "	Excellent measures; irradiation, o".1.
16	7 10	3.40	63.7	10	4–5	600	4	See	" "	Irradiation o".1.
16	7 14	3.41	63.9	10	4–5	600	4	See	" "	Limb perfectly sharp; disk absolutely round; planet very bright; irradiation large.
18	7 51	3.50	65.7	10	5	600	4	See	" "	
18	7 56	3.58	67.2	10	5	600	4	See	" "	Disk absolutely round. perfectly sharp; irradiation o".25.
18	7 59	3.56	66.8	10	5	600	4	See	" "	
18	8 2	3.59	67.4	10	5	600	4	See	" "	Limb perfectly sharp; disk absolutely round.
18	8 4	3.48	65.3	10	5	600	4	See	" "	
19	7 31	3.64	68.4	10	4	600	4	See	" "	Excellent measures; disk absolutely round, limb quite sharp, no markings; irradiation probably o".22 at each limb.
19	7 34	3.58	67.3	10	4	600	4	See	" "	Irradiation perhaps o".2 at each limb.
20	7 6	3.55	66.7	10	4–5	600	4	See	" "	Disk absolutely round; irradiation perhaps o".2 at each limb.
20	7 18	3.66	68.8	10	4–5	600	4	See	" "	Somewhat fuzzy.
.22	7 24	3.60	67.8	10	3	600	4	See	" "	
28	7 28	3.56	67.4	10	4–5	600	4	See	" "	
29	7 53	3.62	68.6	10	4	600	4	See	" "	
30	7 10	3.61	68.5	10	3–4	600	4	See	" "	
1902										
June 1	13 31	3.84	69.7	10	5	600	..	See	26-inch	Excellent measures; steady, but blurred at times; disk absolutely round; no color cell recorded.
Aug. 23	8 15	3.39	63.9	10	3–4	600	4	See	" "	
29	6 35	2.87	54.4	10	4	600	4	See	" "	
29	6 39	2.64	50.0	10	5	600	4	See	" "	
29	6 41	2.64	50.0	10	5	600	4	See	" "	
29	6 43	2.74	51.9	10	5	600	4	See	" "	
29	6 45	2.72	51.5	10	5	600	4	See	" "	
29	6 46	2.71	51.3	10	5	600	4	See	" "	
29	6 48	2.71	51.3	10	5	600	4	See	" "	
29	6 49	2.84	53.8	10	5	600	4	See	" "	
29	6 50	2.80	53.0	10	5	600	4	See	" "	Excellent measures on Aug. 29; image perfectly round and sharp at limb.
29	6 52	2.91	55.1	10	5	600	4	See	" "	
30	6 38	3.01	57.1	10	4–5	600	4	See	" "	
30	6 39	2.99	56.7	10	4–5	600	4	See	" "	
30	6 40	2.96	56.1	10	4–5	600	4	See	" "	
30	6 41	3.02	57.3	10	4–5	600	4	See	" "	
30	6 42	3.04	57.6	10	4–5	600	4	See	" "	
30	6 44	3.02	57.3	10	4–5	600	4	See	" "	
30	6 45	3.14	59.5	10	4–5	600	4	See	" "	
30	6 46	3.11	59.0	10	4–5	600	4	See	" "	
30	6 47	3.06	58.0	10	4–5	600	4	See	" "	Measures fairly good.
30	6 48	3.16	59.9	10	4–5	600	4	See	" "	
31	6 42	3.00	56.9	10	4	600	4	See	" "	
31	6 45	3.21	60.9	10	4	600	4	See	" "	
31	6 46	3.12	59.2	10	4	600	4	See	" "	
31	6 47	3.14	59.6	10	4	600	4	See	" "	

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DIAMETER OF URANUS—Continued.

90°–270°—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF MEASURES.	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1902	h m	"	"							
Aug. 31	6 48	3.14	59.6	10	4	600	4	See	26-inch	
31	6 50	3.12	59.2	10	4	600	4	See	" "	
31	6 52	3.26	61.9	10	4	600	4	See	" "	
31	6 53	3.27	62.0	10	4	600	4	See	" "	
31	6 54	3.28	62.2	10	4	600	4	See	" "	A little unsteady; limb somewhat fuzzy.
31	6 55	3.19	60.5	10	4	600	4	See	" "	
Sept. 1	6 51	3.24	61.5	10	4	600	4	See	" "	
1	6 52	3.22	61.2	10	4	600	4	See	" "	
1	6 53	3.24	61.5	10	4	600	4	See	" "	
6	6 23	2.88	54.9	10	4	600	4	See	" "	
6	6 24	2.96	56.5	10	4	600	4	See	" "	
6	6 27	2.88	54.9	10	4	600	4	See	" "	
6	6 29	2.99	57.0	10	4	600	4	See	" "	Image a little unsteady; sky just the right brightness.
6	6 32	2.96	56.5	10	4	600	4	See	" "	
7	6 21	3.06	58.4	10	4	600	4	See	" "	
7	6 22	3.00	57.3	10	4	600	4	See	" "	
7	6 23	3.05	58.2	10	4	600	4	See	" "	
7	6 24	2.98	56.9	10	4–5	600	4	See	" "	
7	6 25	3.00	57.3	10	4–5	600	4	See	" "	Image excellent; sky just the right brightness.
10	6 19	3.00	57.4	10	4	600	4	See	" "	A little unsteady.
10	6 20	3.02	57.8	10	4	600	4	See	" "	
10	6 21	3.00	57.4	10	4	600	4	See	" "	
10	6 22	3.08	59.0	10	4	600	4	See	" "	Image faint and a little tremulous.
10	6 23	3.06	58.6	10	4	600	4	See	" "	Field just the right intensity.
11	6 24	3.14	60.2	10	4	600	4	See	" "	
11	6 25	3.13	60.0	10	4	600	4	See	" "	
11	6 26	3.21	61.5	10	4	600	4	See	" "	
11	6 27	3.22	61.7	10	4	600	4	See	" "	
11	6 28	3.18	60.9	10	4	600	4	See	" "	A little unsteady; sky just the right intensity.

August 8, 9, and 16, 1901, the observations were made in daylight. From August 29 to September 11, 1902, inclusive, the observations were made in daylight.

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DIAMETER OF NEPTUNE.

0°–180°.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1899	h m	"	"							
Oct. 24	14 ..	2.06	60.3	10	4–5	...	..	See	26-inch	Limb sharp; markings on disk in form of two equatorial belts seen distinctly, but only for a moment.
25	13 ..	2.31	67.6	10	...	600	..	See	" "	Seeing rather poor.
Nov. 8	12 ..	1.97	57.4	10	4–5	...	..	See	" "	Quite steady; image round and sharp at the limb.
Dec. 21	9 ..	2.06	59.5	10	3–4	...	..	See	" "	Limb good, but a little fuzzy; image quiescent.
1900										
Jan. 15	9 ..	2.08	60.4	10	4	...	..	See	26-inch	Quite steady, but limb a little fuzzy.
Oct. 29	17 34	2.24	65.5	10	4	400	4	See	" "	Foggy.
Dec. 1	15 30	2.38	68.9	10	4	400	4	See	" "	
1	15 47	2.20	63.7	10	3–4	888	4	See	" "	
10	14 32	2.20	63.6	10	3	888	4	See	" "	Somewhat blurred; no markings visible.
13	7 46	2.31	66.8	10	4	400	4	See	" "	
13	7 50	2.22	64.2	10	4	400	4	See	" "	
13	8 2	2.01	58.1	10	4	888	4	See	" "	Measure extremely good.
1901										
Jan. 13	9 45	1.90	55.1	10	4	400	4	See	26-inch	Suspect faint belts like those on Jupiter, extending in position angle 335°; confirmed by Mr. Dinwiddie; also suspect oblateness of $\frac{1}{10}$ in position angle 155°; air clear but unsteady.
13	10 2	1.96	56.8	10	4	600	4	See	" "	
13	10 26	2.04	59.1	10	4	888	4	See	" "	
15	8 56	2.13	61.8	10	3	888	4	See	" "	
15	9 7	1.99	57.7	10	3	888	4	See	" "	Fuzzy.
Feb.[23]	7 1	1.99	58.7	10	4	600	4	See	" "	Rather fuzzy.
Sept. 23	15 23	2.12	63.4	10	5	600	5	See	" "	Excellent measures.
23	15 51	2.17	64.8	10	5	600	5	See	" "	Excellent measures; disk perfectly sharp at limb; image a little fuzzy.
24	15 14	2.16	64.5	10	4–5	600	5	See	" "	Estimated irradiation 0".075 at each limb.
1903										
Feb. 6	6 10	2.86	83.5	10	e	705	..	K.	12-inch	
6	6 30	2.84	82.9	10	e	500	..	K.	" "	
6	6 50	2.83	82.6	10	e	335	..	K.	" "	
18	6 25	2.83	83.1	10	g	235	..	K.	" "	
18	6 32	2.85	83.7	10	g	160	..	K.	" "	
18	6 40	2.88	84.6	10	g	115	..	K.	" "	
25	6 50	2.90	85.4	10	e	705	..	K.	" "	
25	7 7	2.70	79.6	10	e	500	..	K.	" "	
25	7 24	2.69	79.3	10	e	335	..	K.	" "	
25	7 40	3.04	89.6	10	e	235	..	K.	" "	

90°–270°.

1899										
Oct. 24	14 ..	2.12	62.1	10	4–5	...	..	See	26-inch	Limb good and sharp.
25	13 ..	2.35	68.8	10	...	600	..	See	" "	Seeing rather poor.
Nov. 8	12 ..	2.09	60.8	10	4–5	...	..	See	" "	Steady; limb sharp; belts on disk unmistakable in position angle 90°±.
Dec. 21	9 ..	2.00	57.8	10	3–4	...	..	See	" "	Limb good, but a little fuzzy; image quiescent.
1900										
Jan. 15	9 ..	2.22	64.4	10	4	...	..	See	26-inch	Quite steady, but limb a little fuzzy.
Oct. 29	17 40	2.10	61.4	10	4	600	4	See	" "	Foggy and still; suspect belts, very faint, in position angle about 90°.
Dec. 1	15 36	2.25	65.1	15	4	400	4	See	" "	
1	15 44	2.14	61.9	10	3–4	888	4	See	" "	
10	14 35	2.19	63.3	10	3	888	4	See	" "	Somewhat blurred.
13	7 53	2.31	66.8	10	4	400	4	See	" "	
13	7 57	2.10	60.7	10	4	888	4	See	" "	

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DIAMETER OF NEPTUNE—Continued.

90°–270°—Continued.

DATE.	WASHINGTON MEAN TIME.	DIAMETER		NUMBER OF SETTINGS	SEEING.	POWER.	COLOR CELL.	OBS'R.	INSTRUMENT.	REMARKS.
		MEASURED.	UNIT DISTANCE.							
1901	h m	"	"							
Jan. 13	9 48	2.09	60.6	10	4	400	4	See	26-inch	Excellent seeing.
13	9 57	1.99	57.7	10	4	600	4	See	" "	Excellent seeing; image sharp.
13	10 30	2.04	59.1	10	4	888	4	See	" "	
15	8 59	2.04	59.2	10	3	888	4	See	" "	Clear but unsteady.
15	9 4	2.03	58.9	10	3	888	4	See	" "	Fuzzy.
Feb.[23]	6 58	2.06	60.8	12	4	600	4	See	" "	Rather fuzzy.
Sept. 23	15 33	2.17	64.8	10	5	600	5	See	" "	Limb perfectly sharp; disk small.
23	15 43	2.21	66.0	10	5	600	5	See	" "	Excellent measures.
24	15 21	2.19	65.4	10	4–5	600	5	See	" "	Seeing became blurred; estimated irradiation 0".075 at each limb.

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OBSERVATIONS OF DOUBLE STARS.

A 115

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DOUBLE STARS.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1899.922	β 1014	0 2 26	+31 7	340.9	1.63	5, 4	3	26-inch	600	Br.	Mags. 7.0–13.5; very difficult.
1901.920	Σ 3063	0 2 29	− 5 6	213.8	1.13	5, 10	2–4	26-inch	400	D.	
.929				215.5	1.80	5, 10	2–3	" "	400	See	Blurred.
.931				216.0	1.95	5, 10	3	" "	400	See	
.942				214.5	1.69	5, 10	2–3	" "	...	See	
1903.626				217.0	1.94	4, 6	f	" "	600	D.	Mags. 8.9–10.6.
1904.891				217.8	1.81	4, 6	2	" "	600	Sk.	Mags. 9.0–10.0; distance poor.
.896				216.8	1.86	4, 6	3	" "	600	Sk.	Mags. 9.0–10.0.
.959				215.9	1.76	4, 6	5	" "	400	Sk.	Mags. 9.0–11.0.
1901.930				215.0	1.64						
1903.626				217.0	1.94						
1904.915				216.8	1.81						
1900.822	Σ 3065	0 2 51	−14 47	107.2	9.93	4, 8	..	12-inch	...	B.	Mags. 8.3–8.3.
1901.931	Σ 4	0 4 43	+ 7 54	93.7	5.46	5, 10	3	26-inch	400	See	
.942				93.0	5.44	5, 10	2–3	" "	...	See	
.948				92.5	5.48	5, 10	3	" "	...	See	
1901.940				93.1	5.46						
1901.942	β 255	0 6 40	+27 52	97.1	0.53	5, 10	2–3	26-inch	...	See	Barely divided.
.948				95.6	0.50	10, 20	3	" "	...	See	Barely divided.
1901.945				96.4	0.52						
1901.931	β 998	0 8 32	+ 6 2	113.3	1.45	5, 10	3	26-inch	400	See	
.942				114.0	1.35	5, 10	4–2	" "	...	See	
.948				112.8	1.25	5, 10	3	" "	...	See	
1901.940				113.4	1.35						
1901.931	β 486	0 9 21	− 8 20	3.7	3.79	5, 10	3	26-inch	400	See	Companion very faint.
.942				2.3	3.07	10, 20	4–2	" "	...	See	
1901.936				3.0	3.43						
1901.961	Σ 12=35 Piscium	0 9 50	+ 8 16	148.3	11.70	5, 10	2	26-inch	...	See	
1903.626	Hu 3	0 11 53	−10 54	107.6	1.17	4, 6	g	26-inch	600	D.	Mags. 10.1–10.2.
1901.931	Σ 22=38 Piscium	0 12 15	+ 8 19	235.0	4.73	5, 10	3	26-inch	400	See	
.942				235.0	4.47	5, 10	2	" "	...	See	
.948				237.4	4.65	5, 10	3	" "	...	See	
1901.940				235.8	4.62						
1899.938	β 393	0 13 13	−21 42	9.3	0.70	4, 4	2–3	26-inch	...	See	Not well separated.
1900.822	β 256	0 14 55	−14 23	264.5	2.66	4, 8	..	12-inch	...	B.	Faint.
1904.973				244.9	2.62	4, 6	2	26-inch	400	Sk.	Mags. 10.0–10.0.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.890	β 1015	0 15 28	+11 45	125.3	0.49	4, 4	3	26-inch	888	Br.	
1898.016				125.6	0.54	4, 4	4	" "	600	Br.	
1899.922				125.0	0.43	4, 4	2	" "	600	See	
1899.922				124.3	0.43	3, 4	2	" "	600	Br.	
1897.953				125.4	0.52						
1899.922				124.6	0.43						
1899.922	β 1093	0 15 45	+10 25	58.4	0.49	4, 4	2	26-inch	600	See	
1901.948	β 777	0 15 57	− 0 49	165.4	3.84	10, 20	3	26-inch	...	See	
1901.948	β 488	0 18 53	− 4 2	344.3	3.29	10, 20	3	26-inch	...	See	
1904.959				348.6	3.08	4, 6	5	" "	400	Sk.	Mags. 8.0–10.0.
1901.948	H 322=12 Ceti	0 24 56	− 4 31	188.3	9.53	5, 10	3	26-inch	...	See	
1901.948	β 1158 (B and C)	0 25 56	−10 38	149.1	0.45	5, 10	2	26-inch	...	See	
1901.948	(A and BC)			86.6	79.43	5, 10	2	26-inch	...	See	
1899.938	Ho 212=13 Ceti	0 30 6	− 4 9	249.5	0.30	4, 4	2–3	26-inch	...	See	A fine pair.
1900.018	(A and B)			251.9	0.26	4, 4	2–3	" "	...	See	Mags. 6.5–7.5, both yellow; clearly divided at times.
1899.978				250.7	0.28						
1899.938	(AB and C)			55.6	31.28	4, 4	2–3	26-inch	...	See	AC=β 490.
1899.922	β 395	0 32 12	−25 19	114.0	0.72	8, 8	2	26-inch	600	See	
.922				105.7	0.66	4, 4	2	" "	600	Br.	
1900.018				109.8	0.61	4, 4	2–3	" "	...	See	
1899.954				109.8	0.66						
1901.931	Σ 49	0 35 43	− 7 47	316.6	6.36	5, 10	2–3	26-inch	400	See	
1904.937				319.7	6.68	4, 6	2	" "	400	Sk.	Mags. 7.0–9.0.
.976				319.7	6.54	4, 6	3–4	" "	400	Sk.	Mags. 7.0–9.0. white, blue.
1901.931				316.6	6.36						
1904.956				319.7	6.61						
1901.970	0Σ 18	0 37 14	+ 3 37	135.3	1.64	5, 10	1–2	26-inch	...	See	
1903.626	β 494	0 41 54	− 1 48	170.1	1.31	4, 6	f	26-inch	600	D.	Mags. 9.2–9.3.
.637				171.3	1.59	4, 6	p	" "	...	D.	
1903.632				170.7	1.45						
1899.856	Σ 60=η Cassiopeiæ	0 43 3	+57 17	218.5	5.55	4, 8	4	26-inch	...	See	
1902.654				224.1	5.79	5, 10	4	" "	...	See	
1906.734	Σ 67	0 46 55	+10 3	0.4	2.15	8, 6	p	26-inch	600	R.	Unsteady and diffuse.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.955	O. Stone 3	0 47 18	−23 9	268.7	2.48	4, 6	2	26-inch	600	Sk.	Mags. 8.0–9.0.
.960				269.2	1.95	4, 6	2	" "	600	Sk.	Very unsteady; images woolly.
1904.954				268.2	2.02	4, 6	3	" "	400	Sk.	Mags. 7.0–8.0.
.976				272.8	1.93	4, 6	2	" "	400	Sk.	Mags. 7.0–8.0.
1903.958				269.0	2.22						
1904.965				270.5	1.98						
1904.948	O. Stone 4	0 48 18	−25 19	12.4	4.95	4, 6	2	26-inch	400	Sk.	Mags. 7.0–9.0.
.951				9.8	5.54	4, 6	3	" "	400	Sk.	Mags. 7.0–9.0.
1904.950				11.1	5.24						
1902.988	Σ 74	0 49 33	+ 8 53	131.2	5.51	5, 10	3	26-inch	400	Sk.	
1898.011	β 302	0 52 59	+20 52	99.7	0.60	4, 4	3	26-inch	600	Br.	
.016				102.4	0.56	4, 4	4	" "	600	Br.	
1898.014				101.0	0.58						
1902.928	S 390	0 53 11	−16 13	33.9	6.44	5, 10	3	26-inch	400	Fk.	
.936				31.8	6.33	5, 10	2–3	" "	400	Sk.	
.961				35.4	6.75	5, 10	2	" "	400	Sk.	
1904.948				33.8	6.31	4, 6	2	" "	400	Sk.	Mags. 8.0–8.0.
.951				34.6	6.54	4, 6	3	" "	400	Sk.	Mags. 8.0–8.0.
.970				34.7	6.74	4, 6	1	" "	400	Sk.	Mags. 8.0–8.0.
1902.942				33.7	6.51						
1904.956				34.4	6.53						
1904.976	β 234	0 55 35	−17 37	150.0	4.05	4, 6	1	26-inch	400	Sk.	Mags. 9.0–9.0.
.995				148.4	4.45	4, 6	2	" "	400	Sk.	Mags. 9.0–9.0.
1904.986				149.2	4.25						
1903.626	Hn 62	0 57 4	− 9 24	288.9	1.15	4, 6	g	26-inch	600	D.	Mags. 9.8–9.8.
.637				289.5	1.27	4, 6	p	" "	...	D.	
1903.632				289.2	1.21						
1902.928	Σ 87	1 0 13	+14 52	196.0	6.58	5, 10	3	26-inch	400	Fk.	
1899.938	β 1228	1 0 33	+12 47	269.7	0.75	4, 4	2–3	26-inch	785	See	
.960				262.7	0.85	4, 4	3–4	" "	...	See	
1899.949				266.2	0.80						
1901.981	β 501	1 1 41	− 5 11	31.6	2.74	5, 10	g	26-inch	...	M.	
1901.918	Σ 91	1 2 4	− 2 16	316.6	4.52	5, 10	3	26-inch	400	D.	
.989				321.3	4.27	5, 10	3	" "	...	See	
1902.928				319.4	4.45	5, 10	3	" "	400	Fk.	
.964				321.4	4.15	5, 10	2	" "	400	Sk.	
.988				320.8	4.27	5, 10	3	" "	400	Sk.	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.637	Σ 91 (Continued).....	1 2 4	− 2 16	318.1	4.33	4, 6	p	26-inch	...	D.	
1904.995				317.8	4.31	4, 6	3	" "	400	Sk.	Mags. 7.0–8.0.
1901.954				319.0	4.40						
1902.960				320.5	4.29						
1903.637				318.1	4.33						
1904.995				317.8	4.31						
1901.989	β 502	1 3 16	+15 15	299.3	3.30	5, 10	3	26-inch	...	See	
1899.924	0Σ 515=φ Andromedæ..	1 3 41	+46 42	244.8	0.35	3, 4	2	26-inch	...	See	Well divided at moments.
1901.989	β 303=201 Piscium.....	1 4 15	+23 16	286.4	0.69	5, 10	3	26-inch	...	See	
1901.989	β 2.....	1 4 52	+29 20	159.7	2.10	5, 10	2–4	26-inch	...	See	
1900.822	Skinner 1.....	1 7 7	−14 10	251.6	9.02	8, 16	..	12-inch	...	B.	Mags. 8.0–9.1.
1899.938	β 503.....	1 11 58	+10 4	135.6	5.51	4, 4	2–3	26-inch	785	See	
.949				131.7	5.05	4, 4	2	" "	...	See	
1901.989				137.7	5.90	5, 10	2–4	" "	...	See	Companion faint.
1899.944				133.6	5.28						
1901.989				137.7	5.90						
1897.890	β 504.....	1 12 11	+ 1 19	281.2	1.82	4, 4	4	26-inch	400	Br.	
.942				279.3	1.75	4, 4	3	" "	600	Br.	
.945				277.4	2.04	4, 4	2	" "	400	Br.	
1899.856				279.0	1.72	4, 8	4	" "	...	See	
.938				276.2	1.49	4, 6	2–3	" "	785	See	
.949				272.2	1.94	4, 4	2	" "	...	See	
1901.989				274.2	1.61	5, 10	2	" "	...	See	
1902.887				276.3	1.70	5, 10	b	" "	...	Fk.	Reddish, blue; very difficult.
1897.926				279.3	1.87						
1899.914				275.8	1.72						
1901.989				274.2	1.61						
1902.887				276.3	1.70						
1901.989	Σ 113=42 Ceti.....	1 14 41	− 1 2	356.0	1.59	5, 10	2	26-inch	...	See	
1902.928				358.0	1.44	5, 10	3	" "	400	Fk.	
1903.015				360.1	1.47	5, 6	3	" "	600	Sk.	Well separated.
.626				355.3	1.51	4, 6	f	" "	600	D.	Mags. 6.8–7.2.
1901.989				356.0	1.59						
1903.190				357.8	1.47						
1902.928	H 2036=187 Ceti.....	1 15 3	−16 20	15.4	1.47	5, 10	3	26-inch	400	Fk.	
1899.938	β 4=255 Piscium.....	1 16 2	+11 1	66.8	0.50	4, 4	2–3	26-inch	785	See	
.960	(A and B)			67.6	0.54	4, 4	3–4	" "	...	See	
1899.949				67.2	0.52						
1899.938	(AB and C).....			247.2	22.04	4, 6	2	26-inch	785	See	

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		h m s	° ′	°	″						
1899.960	β 505=θ Ceti	1 19 1	− 8 42	58.1	60.62	4, 6	3–4	26-inch	...	See	
1901.989	Σ 120=202 Ceti	1 19 58	− 6 28	277.9	7.41	5, 10	2	26-inch	...	See	
1901.989	Σ 122	1 21 43	+ 3 1	326.0	6.07	5, 10	2	26-inch	...	See	
1901.989	β 1164=95 Piscium	1 22 28	+ 4 50	162.4	0.39	5, 10	2	26-inch	...	See	
1903.626	β 399=211 Ceti	1 22 47	−11 25	298.6	1.87	4, 6	f	26-inch	600	D.	Mags. 6.2–9.7; red, blue.
1903.626	Hu 7	1 23 10	− 9 48	209.2	1.62	4, 6	g	26-inch	600	D.	Mags. 9.0–9.8.
1901.981	β 869	1 31 6	+ 3 48	197.5	5.36	5, 10	g	26-inch	...	M.	
1897.945	β 5=103 Piscium	1 33 51	+16 7	292.6	1.48	4, 4	.2	26-inch	600	Br.	
1898.016				291.6	1.36	4, 4	2	" "	600	Br.	
.022				288.1	1.29	3, 4	2–3	" "	600	Br.	
1899.914				289.8	1.30	4, 6	2–3	" "	600	See	
.914				290.2	1.05	4, 4	3	" "	600	Br.	Mags. 7.0–11.0.
1897.994				290.8	1.38						
1899.914				290.0	1.18						
1903.626	Σ 147=χ^1 Ceti	1 36 49	−11 49	87.4	3.44	4, 6	f	26-inch	600	D.	Mags. 6.2–7.5.
1904.973				93.3	3.43	4, 6	2	" "	400	Sk.	Mags. 6.0–8.0.
.995				90.2	3.53	4, 6	2	" "	400	Sk.	Mags. 6.0–8.0; yellow, blue.
1903.626				87.4	3.44						
1904.984				91.8	3.48						
1897.942	β 509	1 38 29	+ 9 4	251.6	0.80	4, 4	3	26-inch	600	Br.	
1899.914				250.8	0.90	4, 6	3	" "	600	See	
.914				251.7	0.73	4, 4	3	" "	600	Br.	
1897.942				251.6	0.80						
1899.914				251.2	0.82						
1899.924	β 784	1 40 40	+22 24	40.8	2.78	4, 4	2	26-inch	...	See	Very fuzzy.
1903.626	β 871	1 42 50	− 1 27	351.3	2.26	4, 6	f	26-inch	600	D.	Mags. 8.4–9.1; blue, orange.
1904.959				353.0	2.00	4, 6	5	" "	400	Sk.	
1897.942	β 260	1 47 50	+14 56	233.5	0.65	4, 4	3	26-inch	600	Br.	
1898.022				234.6	0.76	4, 4	3	" "	600	Br.	
1900.009				234.2	0.87	4, 4	2–3	" "	...	See	Blurred.
.023				236.8	0.67	4, 4	2	" "	...	See	
1897.982				234.0	0.70						
1900.016				235.5	0.77						
1899.856	Σ 186	1 50 43	+ 1 21	203.6	0.40	4, 8	4	26-inch	...	See	Well divided.
.914				203.1	0.36	4, 4	3	" "	600	See	
1899.885				203.4	0.38						
1902.928	Σ 202=σ Piscium	1 56 52	+ 2 17	317.7	3.08	5, 10	3	26-inch	400	Fk.	

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		h m s	° ′	°	″						
1899.924	*0Σ* 38=γ Andromedæ (B and C)	1 57 46	+41 51	112.5	0.35	4, 4	2	26-inch	...	See	
1899.924	(A and BC)			63.6	9.94	4, 6	2	26-inch	...	See	AB=Σ205=[illegible] III.5.
1901.989	β 516	2 0 7	− 1 27	286.2	0.61	5, 10	2	26-inch	...	See	
1901.989	Σ 218	2 3 36	− 0 55	249.8	5.20	5, 10	2	26-inch	...	See	
1903.051				253.0	5.53	4, 6	3	" "	400	Sk.	
.062				250.1	4.99	4, 6	3	" "	400	Sk.	
1905.011				249.0	5.16	4, 6	2–3	" "	400	Sk.	Mags. 8.0–9.0.
1901.989				249.8	5.20						
1903.056				251.6	5.26						
1905.011				249.0	5.16						
1903.626	Hastings	2 11 4	−18 42	353.9	2.42	4, 6	f	26-inch	600	D.	Mags. 8.1 – 8.4; green, yellow.
1901.989	β 518=389 Ceti	2 24 15	+ 9 7	149.9	1.81	5, 10	2	26-inch	...	See	
1907.911	Hammond [B.D +4°405]	2 24 28	+ 4 26	67.7	3.70	4, 6	g	26-inch	600	Hd.	Mags. 9.0–12.8; probably new.
1908.007				67.5	3.47	4, 6	g	" "	400	Hd.	
1907.959				67.6	3.58						
1900.009	β 519	2 24 39	− 2 43	53.4	0.78	4, 4	2–3	26-inch	...	See	
1901.989				59.3	0.88	5, 10	2	" "	...	See	
1903.637	Howe 6	2 26 45	− 8 0	225.6	2.59	4, 6	p	26-inch	...	D.	
1903.024	Σ 280	2 29 8	− 6 4	166.4	3.66	4, 6	3	26-inch	600	Sk.	
.026				168.7	3.67	4, 6	2–3	" "	600	Sk.	
.032				167.2	3.77	4, 6	2	" "	400	Sk.	
.626				166.1	3.86	4, 6	f	" "	600	D.	Mags. 7.7–7.9.
1905.011				168.2	3.65	4, 6	3	" "	400	Sk.	Mags. 7.0–8.0.
1903.177				167.1	3.74						
1905.011				168.2	3.65						
1900.018	β 520	2 31 49	− 4 0	194.0	0.63	4, 4	2–3	26-inch	...	See	Barely divided at best moments.
1901.989				195.0	0.68	5, 10	2	" "	...	See	
1903.037	Ho 315	2 33 53	− 2 1	358.3	1.61	4, 6	3	26-inch	600	Sk.	
.037				359.1	1.39	4, 6	p	" "	600	Fk.	
.626				358.9	1.67	4, 6	f	" "	600	D.	Mags. 9.4 – 9.6; blue, yellow.
1903.233				358.8	1.56						
1902.961	Σ 295=84 Ceti	2 36 6	− 1 7	322.6	4.75	5, 10	p	26-inch	400	Fk.	
.977				319.5	4.67	5, 10	3	" "	400	Sk.	
1903.051				318.7	4.55	4, 6	3	" "	400	Sk.	
.062				320.8	4.51	4, 6	3	" "	400	Sk.	
.637				323.6	4.31	4, 6	h	" "	...	D.	
1903.138				321.0	4.56						

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		h m s	° ′	°	″						
1902.977	Σ 299=γ Ceti	2 38 7	+ 2 49	294.8	3.38	5, 10	3	26-inch	400	Sk.	
1898.011	β 10	2 45 22	− 5 24	98.6	2.86	4, 4	3	26-inch	600	Br.	
1900.009				97.4	3.11	4, 4	2–3	" "	...	See	
.012				98.1	2.87	4, 4	3	" "	...	See	
1903.015				102.1	2.69	4, 6	2	" "	600	Sk.	
.037				104.0	2.82	4, 6	3	" "	600	Sk.	Mags. 7.0–10.0; white, blue.
.037				98.4	2.56	4, 6	p	" "	600	Fk.	
1898.011				98.6	2.86						
1900.010				97.8	2.99						
1903.030				101.5	2.69						
1900.012	β 1174	2 58 44	−11 22	296.7	1.04	4, 4	3	26-inch	...	See	Very difficult; blurred.
.018				295.9	1.17	4, 4	2–3	" "	...	See	
1900.015				296.3	1.10						
1900.023	β 527	3 1 20	−13 49	69.9	0.91	4, 4	2	26-inch	...	See	Mags. 7.9–8.5.
1899.815	A. Clark 2=95 Ceti	3 13 15	− 1 18	159.0	0.35	4, 4	2	26-inch	888	See	
.818				155.1	0.34	4, 4	..	" "	...	See	Distinctly separated.
1899.816				157.0	0.35						
1903.037	β 12	3 19 43	−14 21	280.5	2.52	4, 6	2	26-inch	600	Sk.	
1900.061	β 532	3 28 23	−10 23	271.5	3.37	4, 4	3	26-inch	...	See	
1899.963	β 1003	3 41 13	−28 11	25.6	2.40	4, 4	3	26-inch	...	See	
1900.061				34.1	2.80	4, 4	3	" "	...	See	
1900.012				29.8	2.60						
1898.052	0Σ 65	3 44 18	+25 17	202.6	0.57	4, 4	3	26-inch	600	Br.	
.112				206.2	0.67	4, 4	3	" "	600	Br.	
1898.082				204.4	0.62						
1899.963	β 541	3 49 54	− 1 34	258.1	1.66	4, 4	3	26-inch	...	See	
1900.061				266.1	1.34	4, 4	3–4	" "	...	See	
1900.012				262.1	1.50						
1900.061	See	3 51 39	− 1 52	193.0	0.3±	2, ..	f–g	26-inch	...	See	Mags. 8.0–12.0; yellow, bluish; distance estimated.
1899.963	β 543	3 52 25	− 1 27	27.2	11.29	4, 6	3	26-inch	...	See	
1900.061				28.0	11.19	4, 4	3–4	" "	...	See	
1900.012				27.6	11.24						
1899.963	β 1042 (A and B)	3 53 40	− 2 56	93.4	55.64	4, 4	3	26-inch	...	See	
1899.963	(B and C)			34.4	1.37	4, 4	3	26-inch	...	See	
1899.963	β 1005	4 0 33	+28 40	61.3	2.89	4, 4	3	26-inch	...	See	

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1898.126	0Σ 531	4 0 54	+37 49	128.0	1.97	4, 4	2	26-inch	600	Br.	Unsteady.
1907.930	Hu 817	4 11 45	+32 23	249.5	3.32	4, 6	g	26-inch	600	Hd.	Mags. 9.0–12.5.
1908.007				248.1	3.34	5, 6	g	" "	400	Hd.	
1907.968				248.8	3.33						
1903.051	Σ 536	4 17 13	− 4 55	165.3	2.01	4, 6	2	26-inch	600	Sk.	
.062				166.4	2.00	4, 6	2–3	" "	600	Sk.	
1903.056				165.8	2.00						
1900.061	β 744=299 Eridani	4 17 22	−25 58	316.8	0.89	4, 4	3–4	26-inch	...	See	
1902.961	Σ 535=230 Tauri	4 17 45	+11 9	327.1	1.59	5, 10	p	26-inch	400	Fk.	
1899.974	β 1235	4 18 31	+22 31	240.6	0.38	4, 4	4	26-inch	...	See	Barely divided.
1900.061	β 1186=248 Tauri	4 21 58	+10 59	176.9	0.57	4, 4	3–4	26-inch	...	See	
1900.061	Σ 554=80 Tauri	4 24 26	+15 25	44.2	0.60	4, 4	3–4	26-inch	...	See	Mags. 6–10.5.
1903.081	Σ 590=55 Eridani	4 38 47	− 8 59	317.6	9.38	4, 6	2	26-inch	600	Sk.	
1899.755	β 883 (A and B)	4 45 40	+10 54	58.7	0.38	4, 8	4	26-inch	...	See	Divided at best moments.
.963				53.7	0.27	4, 4	3–4	" "	...	See	
.976				53.6	0.28	4, 4	4	" "	...	See	Nicely divided.
1901.080				70.2	0.23	4, 8	2–3	" "	888	See	
1902.222				68.8	0.32	5, 10	2–3	" "	600	See	
1899.898				55.3	0.31						
1901.080				70.2	0.23						
1902.222				68.8	0.32						
1899.963	(AB and C)			154.3	17.71	4, 4	3–4	26-inch	...	See	
.976				154.9	17.84	4, 4	4	" "	...	See	
1902.222				155.6	17.78	5, 10	2–3	" "	600	See	
1899.970				154.6	17.78						
1902.222				155.6	17.78						
1899.755	β 552=11 Orionis	4 46 11	+13 29	202.3	0.60	4, 4	4	26-inch	...	See	Mags. 7.0–10.5; obs. doubtful.
.963				200.4	0.43	4, 4	3–4	" "	...	See	Divided at best moments.
.976				202.8	0.36	4, 4	4	" "	...	See	Divided at best moments.
1902.222				210.3	0.34	4, 10	2–3	" "	600	See	
1899.898				201.8	0.46						
1902.222				210.3	0.34						
1901.080	β 1237	4 47 40	+23 23	60.0	4.32	4, 8	2–3	26-inch	600	See	
1898.117	0Σ 90	4 49 30	+ 8 26	341.4	2.01	3, 4	2	26-inch	600	Br.	
1898.115	β 314=3 Leporis	4 54 33	−16 32	326.2	0.86	4, 4	4	26-inch	600	Br.	Mags. 7.0–10.0.
1899.971	(A and B)			310.5	0.96	4, 4	2	" "	...	See	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1898.189	0Σ 93	4 55 11	+ 4 57	51.8	0.56	4, 4	2	26-inch	888	Br.	
1903.081	Σ 636	4 58 15	− 8 48	100.3	3.73	4, 6	2–3	26-inch	600	Sk.	
1899.976	β 1047=47 Aurigæ (A and B)	5 3 28	+27 54	27.4	11.66	4, 4	4	26-inch	...	See	
1898.115	β 885	5 5 54	− 1 53	194.8	0.70	4, 4	4	26-inch	600	Br.	
1899.963				191.7	0.77	4, 4	3–4	" "	...	See	
.971				188.4	0.82	4, 4	2	" "	...	See	
1898.115				194.8	0.70						
1899.967				190.0	0.80						
1903.081	Σ 661=κ Leporis	5 8 37	−13 4	356.0	2.84	4, 6	2	26-inch	600	Sk.	Mags. 5.0–8.0; white, blue; measures difficult.
.169				360.0	2.36	4, 6	2–3	" "	600	Sk.	Mags. 5.0–7.0.
1903.125				358.0	2.60						
1898.115	β 318	5 11 15	− 3 36	238.3	0.57	4, 4	4	26-inch	888	Br.	
1899.976				234.4	0.62	4, 4	3–4	" "	...	See	
1899.976	Σ 728=32 Orionis	5 25 26	+ 5 52	149.8	0.26	4, 4	3–4	26-inch	...	See	
1900.042				151.5	0.30	4, 4	4	" "	...	See	
1900.009				150.6	0.28						
1903.109	Σ 729=33 Orionis	5 26 0	+ 3 13	22.4	1.72	4, 8	g	12-inch	335	K.	
1903.109	Σ 738=λ Orionis	5 29 38	+ 9 51	40.5	4.10	4, 8	f	12-inch	335	K.	
1903.037	Σ 774=ζ Orionis (A and B)	5 35 43	− 2 0	156.6	2.48	4, 6	p	26-inch	600	Fk.	
1898.112	0Σ 115	5 38 48	+15 1	118.2	0.76	4, 4	3	26-inch	600	Br.	
1898.112	0Σ 119	5 42 29	+ 7 56	320.2	0.69	4, 4	3	26-inch	600	Br.	
1903.172	β 94=61 Leporis	5 45 4	−14 31	182.4	2.66	4, 6	3	26-inch	600	Sk.	Mags. 6.0–8.5; white, blue.
1903.172	β 16=3 Monocerotis	5 57 8	−10 36	356.3	1.75	4, 6	3	26-inch	600	Sk.	White, blue.
1900.828	Skinner 2	5 59 36	−15 41	169.1	4.82	4, 8	..	12-inch	...	B.	Mags. 8.0–9.5.
1898.112	Σ 840 (B and C)	6 0 55	+10 46	171.1	0.80	4, 4	3	26-inch	600	Br.	Mags. 9.0–10.0.
1898.117	0Σ 132	6 1 20	+38 0	319.9	1.76	4, 4	2	26-inch	600	Br.	Thick.
1903.117	Hu 106	6 4 39	−11 40	334.8	0.92	4, 6	p	26-inch	...	D.	Mags. 9.2–9.6.

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.042	β 1008=η Geminorum	6 8 50	+22 32	290.8	1.59	4,4	4	26-inch	...	See	Reddish and purple.
1900.042	β 566=21 Monocerotis	6 9 40	− 4 32	204.5	2.13	4,4	4	26-inch	...	See	
1900.042	β 1019	6 11 7	− 2 51	272.4	1.08	4,4	4	26-inch	...	See	
1903.109	Hu 108	6 12 38	−10 41	332.0	3.40	4,6	p	26-inch	...	Fk.	
1898.167	Σ 919=11 Monocerotis (A and B)	6 23 58	− 6 58	131.6	7.47	4,4	2	26-inch	600	Br.	
1898.167	(B and C)			105.0	2.60	4,4	2	26-inch	600	Br.	
1903.117	Hu 43	6 28 54	−12 2	316.9	1.09	4,6	p	26-inch	...	Fk.	Mags. 8.6–9.2.
1898.186	Σ 3117	6 35 52	+ 9 50	85.6	0.90	4,4	2	26-inch	600	Br.	
1903.117	Σ 955 (A and B)	6 36 22	− 7 54	274.1	0.74	4,6	p	26-inch	...	D.	Mags. 8.8–9.1.
1903.117	Hu 46	6 37 42	−12 12	153.4	2.57	4,6	p	26-inch	....	Fk.	Mags. 9.2–10.7.
1899.210	A. G. Clark 1=Sirius	6 40 44	−16 35	170.7	4.79	3,3	2	26-inch	600	Br.	
[.755]				[136.8]	[5.90]	2,4	4	" "	...	See	Obs. doubtful.
[.818]				[159.1]	[5.64]	4,4	..	" "	...	See	Obs. uncertain.
.820				153.9	4.65	2,3	..	" "	...	See	Obs. good.
1900.042				145.3	4.65	4,4	4	" "	...	See	
.248				149.2	4.65	4,8	2–3	" "	400	See	
.300				147.3	4.41	7,4	3–4	" "	600	See	Companion distinct at times.
.316				154.9	4.80	4,6	3–4	" "	600	See	
.319				152.4	4.63	4,6	4	" "	800	See	
1901.277				141.0	5.48	5,10	3	" "	400	See	Difficult.
.291				143.2	5.65	5,8	3–4	" "	600	See	Companion sharply defined.
.293				143.7	4.80	5,8	4	" "	600	See	
.318				143.2	4.55	5,4	4	" "	600	See	Unsteady but clear at moments.
.321				142.4	5.03	4,4	4	" "	400	See	Companion difficult.
1902.222				129.8	5.30	4,10	4–5	" "	400	See	
.222				133.8	5.12	5,10	4–5	" "	600	See	Good measures.
.227				130.9	5.34	5,10	4–5	" "	400	See	Companion well seen.
.309				134.1	5.74	5,10	3–4	" "	400	See	Unsteady but companion clear at times.
1903.213				123.1	....	4,..	..	" "	600	Sk.	
.232				118.4	5.10	5,6	..	" "	...	Fk.	
1899.210				170.7	4.79						
1900.174				150.5	4.63						
1901.300				142.7	5.10						
1902.245				132.2	5.38						
1903.222				120.8	5.10						
1898.202	0Σ 156	6 41 33	+18 18	302.3	0.64	4,4	3	26-inch	888	Br.	
1899.314	Σ 963=14 Lyncis	6 44 16	+59 34	81.9	0.48	6,4	3	26-inch	888	Br.	
.325				81.0	0.43	4,4	2	" "	600	Br.	
1899.320				81.4	0.46						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1901.291	β 897=97 Monocerotis...	6 45 43	− 0 25	32.8	5.81	5, 8	3	26-inch	400	See	
1899.314	0Σ 159=15 Lyncis.....	6 48 37	+58 33	14.1	1.01	4, 4	3	26-inch	{600 888}	Br.	
1898.186	β 326.....	6 50 59	+ 2 27	56.7	1.32	4, 4	3	26-inch	600	Br.	
1900.122	ε Canis Majoris.....	6 54 42	−28 50	159.0	8.25	4, 8	2	26-inch	...	See	
1903.100	Hu 111.....	6 55 24	−11 52	16.1	3.11	4, 6	..	26-inch	...	Fk.	Mags. 8.5–8.6.
1898.183	0Σ 163 (A and B).....	6 55 35	+11 55	327.4	0.52	4, 4	2	26-inch	888	Br.	
1896.198	Skinner 3.....	6 58 13	−17 38	274.9	5.72	3, 4	..	26-inch	...	Br.	Thick; barely visible.
.212				275.0	5.77	2, 4	..	" "	...	Br.	
1900.828				274.3	5.17	4, 8	..	12-inch	...	B.	Mags. 8.7–9.1.
1896.205				275.0	5.74						
1900.828				274.3	5.17						
1896.190	Skinner 4.....	7 0 50	−16 29	338.5	4.48	3, 4	..	26-inch	...	Br.	Thick; barely visible.
.212				336.1	4.42	4, 4	..	" "	...	Br.	
1900.828				338.1	4.37	4, 8	..	12-inch	...	B.	Mags. 9.0–9.4.
1896.201				337.3	4.45						
1900.828				338.1	4.37						
1905.203	Σ 1029.....	7 3 0	− 4 31	24.6	1.88	4, 6	..	26-inch	400	Sk.	
1898.186	0Σ 170.....	7 12 10	+ 9 28	109.7	1.58	4, 4	3	26-inch	600	Br.	
1896.198	Skinner 5.....	7 14 49	−16 37	284.3	3.00	3, 4	f	26-inch	...	Br.	
1900.316				291.8	2.56	4, 8	..	12-inch	...	B.	
1898.186	Σ 1074.:.....	7 15 23	+ 0 35	144.4	0.61	4, 4	3	26-inch	{600 888}	Br.	
1902.309				139.4	0.80	5, 10	3–4	" "	400	See	Separated.
1903.100	Hu 456.....	7 27 56	−17 18	222.7	3.66	4, 6	..	26-inch	...	Fk.	Mags. 9.2–11.5.
1900.247	Σ 1110=α Geminorum...	7 28 13	+32 6	230.3	6.41	4, 8	..	12-inch	115	B.	
·332				225.7	5.98	4, 6	4	26-inch	400	See	
·335				225.2	5.52	4, 4	3	" "	600	See	
1900.305				227.1	5.97						
1899.325	Σ 1107.....	7 32 4	+76 2	202.6	1.29	4, 4	2	26-inch	600	Br.	
1898.167	0Σ 176.....	7 33 22	+ 0 44	214.7	1.52	4, 4	2	26-inch	600	Br.	
1900.075	Schæberle=Procyon	7 34 4	+ 5 29	306.4	4.17	2, 2	2–3	26-inch	...	See	

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.248	Schæberle—(Continued) .	7 34 4	+ 5 29	325.4	4.55	4, 4	2–3	26-inch	400	See	
.300				335.0	4.21	4, 4	3–4	" "	785	See	
.316				337.0	5.12	5, 6	4	" "	600	See	Companion very distinct.
.319				332.1	4.52	4, 6	4	" "	785	See	Companion well seen.
1901.277				319.1	5.32	5, 10	3	" "	400	See	Difficult.
.291				342.4	5.08	5, 8	3–4	" "	600	See	Very sharp at moments.
.293				345.8	4.49	5, 8	4	" "	600	See	
.318				340.9	5.14	5, 4	4	" "	600	See	Very difficult.
.321				341.5	4.95	4, 4	4	" "	400	See	Companion faint
1902.222				337.0	5.22	5, 10	4–5	" "	600	See	and difficult.
.227				334.7	5.40	5, 10	4	" "	400	See	
.309				343.6	5.42	5, 10	4	" "	400	See	Companion difficult.
1900.252				327.2	4.51						
1901.300				337.9	5.00						
1902.253				338.4	5.35						
1903.100	Hu 457	7 34 45	+23 29	145.5	2.55	4, 6	..	26-inch	...	Fk.	Mags. 8.7–12.0.
1897.244	Σ 1126	7 34 48	+ 5 28	143.8	1.07	4, 4	..	26-inch	600	Br.	Unsteady.
1900.261	0Σ 179=κ Geminorum	7 38 25	+24 38	234.5	....	4, ..	..	12-inch	...	B.	Companion faint.
.275				239.2	6.22	4, 8	..	" "	...	B.	Hurried.
.321				238.7	....	4, ..	..	" "	...	B.	Faint through
.357				244.6	6.66	4, 8	g	" "	...	B.	haze.
1900.304				239.2	6.44						
1898.183	β 101=9 Argus	7 47 8	−13 38	293.3	0.62	4, 4	3	26-inch	888	Br.	
.186				291.8	0.63	4, 4	2	" "	888	Br.	
1900.239				293.4	0.73	4, 4	2	" "	400	See	
.239				293.1	0.70	5, 4	2	" "	600	See	
.286				295.2	0.65	4, 6	2–3	" "	...	See	
1901.250				294.1	0.62	5, 8	2	" "	...	See	
.277				302.1	0.73	5, 4	2	" "	400	See	
1898.184				292.6	0.62						
1900.255				293.9	0.69						
1901.264				298.1	0.68						
1898.186	Σ 1157	7 49 31	− 2 32	245.5	1.21	4, 4	2	26-inch	600	Br.	
1898.183	0Σ 185	7 52 8	+ 1 24	22.3	0.30	4, 4	3	26-inch	888	Br.	
1899.303				17.7	0.37	4, 4	2	" "	888	Br.	
.308				18.0	0.34	4, 4	3	" "	888	Br.	
1898.183				22.3	0.30						
1899.306				17.8	0.36						
1899.306	Σ 1175	7 57 10	+ 4 26	225.1	1.86	4, 4	2	26-inch	600	Br.	
1898.183	0Σ 186	7 57 14	+26 33	73.4	0.82	4, 4	4	26-inch	888	Br.	
1899.308	0Σ 187	7 57 46	+32 19	261.6	0.32	4, 6	3	26-inch	888	See	
.308				262.4	0.27	4, 4	3	" "	888	Br.	
.314				266.0	....	4, ..	3	" "	888	Br.	Estimated distance 0″.30.
1899.310				263.3	0.30						

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1898.178	β 581 (A and B).....	7 58 50	+12 35	286.2	0.57	6, 4	3	26-inch	600	Br.	
.183				279.6	0.58	4, 4	2	" "	888	Br.	
.189				280.3	0.64	4, 4	3	" "	888	Br.	
1900.239				289.0	0.51	5, 4	2	" "	600	See	
.286				288.1	0.47	4, 6	2–3	" "	...	See	
1901.250				300.4	0.55	4, 8	2	" "	...	See	
.291				288.3	0.60	4, 8	3–4	" "	400	See	
1898.183				282.0	0.60						
1900.262				288.6	0.49						
1901.270				294.4	0.58						
1898.178	(AB and C).....			195.7	4.59	4, 4	3	26-inch	600	Br.	
1900.239				192.7	5.35	4, 4	2	" "	600	See	
.286				192.7	4.67	4, 6	2–3	" "	...	See	
1901.250				192.6	5.26	4, 8	2	" "	...	See	
.291				195.6	5.10	4, 8	3–4	" "	400	See	
1898.178				195.7	4.59						
1900.262				192.7	5.01						
1901.270				194.1	5.18						
1897.249	Σ 1196=ζ Cancri..... (A and B)	8 6 29	+17 57	14.6	0.80	4, 4	2	26-inch	600	Br.	
.252				15.7	1.12	4, 4	3	" "	600	Br.	
1898.232				10.8	1.09	4, 4	2	" "	600	Br.	
1899.207				8.1	1.09	4, 4	2	" "	600	Br.	
.226				7.1	1.12	4, 4	2	" "	600	Br.	
1900.332				3.0	1.00	4, 4	4	" "	400	See	
.335				2.6	1.07	4, 4	3	" "	600	See	
1897.250				15.2	0.96						
1898.232				10.8	1.09						
1899.216				7.6	1.10						
1900.334				2.8	1.04						
1897.252	(AB and C)			121.4	5.38	4, 4	3	26-inch	600	Br.	
1900.332				112.2	5.21	4, 4	4	" "	400	See	
.335				113.7	5.42	4, 4	3	" "	600	See	
1897.252				121.4	5.38						
1900.334				113.0	5.32						
1899.207	(A and C).....			116.0	5.50	4, 4	2	26-inch	600	Br.	
.226				115.5	5.48	4, 4	2	" "	600	Br.	
1899.216				115.8	5.50						
1903.172	β 102.....	8 11 58	−8 42	119.4	3.60	4, 6	3	26-inch	600	Sk.	Mags. 7.0–10.0.
1903.172	β 206.....	8 31 9	−24 46	280.8	1.96	4, 6	3	26-inch	600	Sk.	
1900.335	Schiaparelli=ε Hydræ.... (A and B)	8 41 29	+ 6 47	204.0	0.12	4, 4	3	26-inch	888	See	Clearly elongated.
1900.267	(AB and C).....			243.6	3.31	4, 8	..	12-inch	...	B.	A and C=Σ 1173.
.272				239.3	3.04	4, 8	..	" "	...	B.	
.335				233.2	3.72	4, 4	3	26-inch	600	See	

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		h m s	° ′	°	″						
1902.279	Schiaparelli—(Continued) (AB and C)	8 41 29	+ 6 47	231.5	3.10	5, 10	3	26-inch	400	D.	Unsteady.
1900.291				238.7	3.36						
1902.279				231.5	3.10						
1900.267	Σ 1280	8 46 15	+71 11	40.7	4.96	4, 8	..	12-inch	...	B.	
.272				43.7	4.89	4, 8	..	" "	...	B.	
1900.270				42.2	4.92						
1903.172	Schj. 11	8 47 2	−10 46	351.4	2.25	4, 6	4	26-inch	600	Sk.	Mags. 9.0–9.5.
1897.315	Σ 1291=ι^2 Cancri	8 48 9	+30 58	327.5	1.38	4, 4	3	26-inch	400	Br.	
1903.172	β 24	8 49 22	− 8 23	179.0	1.26	4, 6	3	26-inch	600	Sk.	Mags. 8.0–9.0.
.194				176.1	1.33	4, 6	4	" "	600	Sk.	Mags. 8.0–9.0.
.215				175.5	1.19	4, 6	2–3	" "	600	Sk.	Mags. 7.5–8.5.
1903.194				176.9	1.26						
1903.229	Σ 1295=17 Hydræ	8 50 36	− 7 35	359.9	4.33	4, 6	2	26-inch	600	Sk.	Mags. 7.0–7.5.
1903.229	β 210	8 52 13	−17 3	182.4	2.57	4, 6	2	26-inch	600	Sk.	
1900.267	OΣ 196=ι Ursæ Majoris	8 52 22	+48 26	355.3	8.75	4, 8	..	12-inch	...	B.	
.299				358.3	7.73	4, 8	..	" "	...	B.	
1900.283				356.8	8.24						
1900.362	Σ 1296	8 53 2	+35 20	95.1	3.89	4, 8	..	12-inch	...	B.	Mags. 7.0–8.0.
1897.378	Σ 1306=σ^2 Ursæ Majoris	9 1 36	+67 32	216.6	1.58	4, 4	3	26-inch	600	Br.	
1899.278				201.3	1.33	4, 4	3	" "	600	Br.	
.284				212.8	1.02	1, 4	3	" "	600	A.	
.303				202.0	1.45	1, 8	2	" "	{888 / 600}	Br.	
.325				199.5	1.33	5, 16	2	" "	{888 / 600}	Br.	
.328				204.0	1.39	4, 10	3	" "	{888 / 600}	Br.	
.423				.....	1.43	.., 4	3	" "	600	Br.	
1897.378				216.6	1.58						
1899.324				203.9	1.32						
1897.255	OΣ 197	9 4 19	+ 3 21	60.4	1.41	4, 4	3	26-inch	400	Br.	
.312				58.2	1.43	4, 4	3	" "	600	Br.	
1897.284				59.3	1.42						
1897.252	Σ 3121	9 11 57	+29 0	14.4	0.62	4, 4	3	26-inch	600	Br.	
.304				12.9	0.74	4, 4	3	" "	888	Br.	
.312				14.2	0.61	4, 4	3	" "	888	Br.	Mags. equal.
1899.275				17.7	0.81	4, 4	2	" "	600	Br.	
1897.289				13.8	0.66						
1899.275				17.7	0.61						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.244	Σ 1334=38 Lyncis	9 12 37	+37 14	235.8	3.00	4, 4	..	26-inch	400	Br.	
1900.261				240.5	2.93	4, 8	..	12-inch	...	B.	
.267				245.0	3.25	4, 8	..	" "	...	B.	
1897.244				235.8	3.00						
1900.264				242.8	3.09						
1897.329	Σ 1331 (A and B)	9 12 58	+61 46	152.7	0.81	4, 4	2	26-inch	400	Br.	
.373				151.7	0.80	4, 4	2	" "	600	Br.	
.378				153.7	0.84	4, 4	3	" "	600	Br.	
1897.360				152.7	0.82						
1897.315	Σ 1338=157 Lyncis	9 14 44	+38 37	165.5	1.57	4, 4	3	26-inch	400	Br.	
1900.362				165.0	2.31	4, 8	..	12-inch	...	B.	
1907.311	β 337	9 17 50	−17 28	330.3	7.52	4, 4	f-p	12-inch	235	R.	Mags. 7.5–10.0.
1897.329	0Σ 200	9 18 0	+52 0	333.9	1.47	4, 4	2	26-inch	400	Br.	
.378				332.0	1.53	4, 4	3	" "	600	Br.	
1900.267				325.3	2.43	4, 8	..	12-inch	...	B.	
.275				329.7	1.74	4, 8	..	" "	...	B.	
1897.354				333.0	1.50						
1900.271				327.5	2.08						
1897.315	0Σ 201	9 18 2	+28 20	222.0	1.35	4, 4	2	26-inch	600	Br.	
1907.311	β 338	9 18 12	−15 4	272.1	6.75	4, 4	f-p	12-inch	235	R.	Mags. 8.5–9.8.
1897.255	Σ 1348=116 Hydræ	9 19 13	+ 6 47	324.3	1.82	4, 4	2	26-inch	400	Br.	
1897.290	Σ 1355	9 22 1	+ 6 40	333.8	2.67	4, 4	2	26-inch	400	Br.	
1900.316	Skinner 6	9 22 26	−16 50	357.2	6.04	4, 8	..	12-inch	...	B.	
1903.292				356.5	6.45	4, 6	4	26-inch	400	Sk.	Mags. 9.0–10.0.
.319				354.7	6.27	4, 6	4–5	" "	600	Sk.	Mags. 8.4–9.5.
1900.316				357.2	6.04						
1903.306				355.6	6.36						
1897.304	Σ 1356=ω Leonis	9 23 6	+ 9 30	106.8	0.87	4, 4	3	26-inch	600	Br.	
.307				112.3	0.82	4, 4	2	" "	600	Br.	Clouds.
1899.207				111.6	0.85	4, 4	2	" "	600	Br.	Unsteady.
.226				110.7	0.83	4, 4	2	" "	600	Br.	
1900.335				112.1	0.67	4, 6	2	" "	600	See	
1902.317				113.4	0.92	5, 10	2	" "	400	See	Blurred.
.328				113.7	0.84	5, 10	3–4	" "	600	See	
1897.306				109.6	0.84						
1899.216				111.2	0.84						
1900.335				112.1	0.67						
1902.322				113.6	0.88						
1903.235	β 591	9 24 33	− 2 41	38.9	0.99	4, 6	3	26-inch	600	Sk.	Mags. 8.5–9.5.
1900.267	Σ 1374=30 Leo. Minoris	9 35 11	+39 24	284.7	3.25	4, 8	..	12-inch	...	B.	
.275				282.6	3.25	4, 8	..	" "	...	B.	
1900.271				283.6	3.25						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1902.279	Σ 1377	9 38 16	+ 3 5	138.7	4.00	5, 10	3	26-inch	400	D.	
.328				138.9	3.95	5, 10	2–3	" "	600	See	
1902.304				138.8	3.98						
1898.232	Σ 1385	9 44 29	+17 2	351.1	1.08	4, 4	2	26-inch	600	Br.	Seeing bad.
1902.328				345.9	1.18	5, 10	2–3	" "	600	See	Unsteady.
1899.300	0Σ 208 = φ Urs. Majoris	9 45 18	+54 32	286.2	0.40	3, 4	3	26-inch	888	Br.	
.314				280.9	0.39	4, 4	2	" "	888	Br.	
.325				283.0	0.39	4, 4	2	" "	888	Br.	
1899.313				283.4	0.39						
1897.290	Σ 1389	9 46 41	+27 27	312.3	2.15	4, 4	2	26-inch	400	Br.	
.323				311.2	2.36	4, 4	2	" "	400	Br.	
1897.306				311.8	2.26						
1897.353	Σ 1386	9 46 50	+69 22	291.5	1.94	4, 3	2	26-inch	600	Br.	
.378				293.1	1.89	4, 4	3	" "	600	Br.	
1900.267				290.7	2.20	4, 8	..	12-inch	...	B.	
.272				296.5	2.06	4, 8	..	" "	...	B.	
1897.366				292.3	1.92						
1900.270				293.6	2.13						
1897.312	A. Clark 5=8 Sextantis (A and B)	9 47 33	− 7 38	102.2	0.33	4, 4	3	26-inch	888	Br.	Clearly separated.
1900.286				89.7	0.42	4, 6	3–4	" "	...	See	Mags. 6.5–7.0;
.300				87.5	0.45	4, 4	3–4	" "	785	See	both yellow.
.316				85.4	0.40	4, 4	4	" "	785	See	
1901.250				95.5	0.50	5, 8	2	" "	...	See	
.277				95.2	0.64	5, 4	2	" "	400	See	Well divided at
.291				96.3	0.64	4, 8	3–4	" "	400	See	moments.
.318				87.1	0.46	5, 8	4	" "	600	See	
1902.312				93.5	0.48	5, 10	2–4	" "	600	D.	
.317				86.8	0.65	5, 10	3	" "	400	See	Separated.
.328				88.3	0.55	5, 10	3	" "	600	See	Tremulous.
1897.312				102.2	0.33						
1900.301				87.5	0.42						
1901.284				93.5	0.56						
1902.319				89.5	0.56						
1901.277	(AB and C)			325.8	35.64	5, 8	2	26-inch	400	See	
.291				324.4	36.25	4, 8	3–4	" "	400	See	
.318				325.8	35.40	5, 8	4	" "	600	See	
1901.295				325.3	35.76						
1907.311	H 825	9 54 44	−14 29	313.4	9.96	4, 4	f–p	12-inch	160	R.	Mags. 9.0–9.8.
1899.278	Σ 1406	9 59 52	+31 34	229.2	1.14	4, 4	3	26-inch	600	Br.	
1903.194	Hd 125	10 1 49	− 1 14	173.6	2.20	4, 6	..	26-inch	600	D.	Mags. 8.5–8.7.
.235				174.4	2.27	4, 6	4–5	" "	600	Sk.	Mags. 9.0–9.5.
1905.282				176.8	2.43	4, 6	3	" "	400	Sk.	Mags. 9.0–9.1.
1903.214				174.0	2.24						
1905.282				176.8	2.43						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.344	Σ 1416	10 7 27	−15 36	277.3	11.92	4, 6	3	26-inch	600	Sk.	Mags. 8.0–10.0.
1899.284	0Σ 213	10 7 30	+27 55	105.5	0.80	4, 4	3	26-inch	600	Br.	
1897.312	0Σ 215	10 10 49	+18 14	211.4	0.89	4, 4	3	26-inch	600	Br.	
.315				211.4	0.84	4, 4	2	" "	600	Br.	
.326				209.4	0.72	4, 4	2	" "	600	Br.	Images very poor.
1899.275				209.1	0.87	4, 4	2	" "	600	Br.	Woolly.
1902.312				207.7	0.70	5, 10	4	" "	600	D.	
1897.318				210.7	0.82						
1899.275				209.1	0.87						
1902.312				207.7	0.70						
1899.281	0Σ 523=39 Leonis	10 11 44	+23 36	298.5	7.39	4, 4	2	26-inch	600	Br.	
1899.281	Σ 1423	10 13 42	+21 4	58.1	1.42	4, 4	2	26-inch	600	Br.	
1897.244	Σ 1424=γ Leonis	10 14 28	+20 21	115.2	3.97	4, 4	..	26-inch	400	Br.	Unsteady.
1900.247				118.0	4.62	4, 8	..	12-inch	115	B.	
.261				116.5	....	4, ..	..	" "	...	B.	
.335				114.0	3.78	4, 4	3	26-inch	600	See	
1897.244				115.2	3.97						
1900.281				116.2	4.20						
1897.304	Σ 1426=145 Leonis (A and B)	10 15 18	+ 6 56	280.2	0.87	4, 4	2	26-inch	600	Br.	
.307				280.6	0.92	4, 4	2	" "	600	Br.	Windy; telescope shakes.
.312				281.6	0.80	4, 4	3	" "	600	Br.	
1897.308				280.8	0.86						
1897.312	(AB and C)			8.4	7.79	4, 4	3	26-inch	600	Br.	
1903.344	Hn 103	10 15 45	−15 51	338.7	1.61	4, 6	3	26-inch	600	Sk.	Mags. 9.0–9.5.
.350				335.7	1.61	4, 6	2–3	" "	600	Sk.	Mags. 9.5–10.0.
1903.347				337.2	1.61						
1907.311	Hn 104	10 15 47	−16 13	14.8	3.43	4, 4	f–p	12-inch	235	R.	Mags. 9.5–9.5.
1903.194	β 25=Schj. 16	10 16 46	− 9 16	179.6	2.44	4, 6	4	26-inch	600	Sk.	Mags. 8.5–11.0.
.333				175.5	1.87	4, 6	3	" "	600	Sk.	Mags. 8.0–8.5.
.344				174.8	2.00	4, 6	3	" "	600	Sk.	Mags. 8.5–9.0.
1905.282				175.8	1.91	4, 6	2–3	" "	400	Sk.	Mags. 8.0–8.5.
1903.290				176.6	2.10						
1905.282				175.8	1.91						
1903.229	β 219	10 16 52	−22 2	188.5	2.43	4, 6	2	26-inch	600	Sk.	Mags. 7.0–9.5.
.344				191.4	1.99	4, 6	3	" "	600	Sk.	Mags. 8.0–10.0.
.350				193.3	2.25	4, 6	2–3	" "	600	Sk.	Mags. 6.0–9.5.
1903.308				191.1	2.22						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1899.284	*0Σ* 216=150 Leonis.....	10 17 23	+15 51	119.6	1.31	4, 4	3	26-inch	600	Br.	*β* 594.
.295				118.6	1.41	4, 4	2	" "	600	Br.	
.306				119.1	1.41	4, 4	2	" "	600	Br.	
1899.295				119.1	1.38						
1903.363	H 4311.....	10 18 24	−12 52	123.3	3.79	4, 6	3	26-inch	600	Sk.	Mags. 6.5–10.0.
1897.282	Σ 1429.....	10 19 29	+25 8	72.8	0.81	4, 4	3	26-inch	600	Br.	
.310				72.2	0.93	4, 4	2	" "	600	Br.	
1897.296				72.5	0.87						
1900.275	Σ 1428.....	10 19 41	+53 8	90.7	2.91	4, 8	..	12-inch	...	B.	
.286				89.1	2.61	4, 8	..	" "	...	B.	
1900.280				89.9	2.76						
1899.295	*0Σ* 217.....	10 21 29	+17 44	155.9	0.83	4, 4	2	26-inch	600	Br.	
1899.284	*0Σ* 218.....	10 22 20	+ 4 4	74.8	0.97	4, 4	3	26-inch	600	Br.	*β* 1281.
1897.255	Σ 1439.....	10 24 38	+21 19	114.2	1.92	4, 4	2	26-inch	400	Br.	Very faint; clouds.
.282				114.7	1.80	4, 4	2	" "	600	Br.	
.310				116.5	2.06	4, 4	3	" "	600	Br.	
1900.286				119.0	2.61	4, 8	..	12-inch	...	B.	
1897.282				115.1	1.93						
1900.286				119.0	2.61						
1903.325	Σ 1441.....	10 25 58	− 7 7	167.5	2.79	4, 6	..	26-inch	600	Fk.	Very unsteady.
.333				161.9	2.76	4, 6	4	" "	600	Sk.	Mags. 6.0–10.0; yellow, blue.
.341				167.5	2.72	4, 6	3	" "	600	Sk.	Mags. 6.0–10.0, white, blue.
.363				164.3	2.68	4, 6	3	" "	600	Sk.	Mags. 6.5–10; yellow, blue.
1903.340				165.3	2.74						
1907.311	Skinner 14.....	10 26 43	−15 53	81.7	6.87	4, 4	f–p	12-inch	160	R.	Mags. 9.0–9.2.
1899.306	Σ 1445.....	10 27 36	− 0 21	160.7	2.66	2, 4	2	26-inch	600	Br.	Poor; unsteady and diffuse.
1903.363				160.6	2.92	4, 6	3	" "	600	Sk.	Mags. 8.5–10.5.
1897.296	Σ 1450=49 Leonis.....	10 29 48	+ 9 10	156.1	2.42	4, 4	2	26-inch	400	Br.	
1900.349				156.2	2.10	4, 4	2	" "	600	See	Clouds.
.352				157.0	2.52	4, 4	1–2	" "	600	See	
.357				158.0	2.71	4, 6	3	" "	600	See	
1902.293				157.2	2.26	5, 10	5–3	" "	600	D.	
1897.296				156.1	2.42						
1900.353				157.1	2.44						
1902.293				157.2	2.26						
1903.358	*β* 411.....	10 31 21	−26 9	280.8	0.99	4, 6	2–3	26-inch	600	Sk.	Mags. 6.0–7.0.
.369				280.7	0.94	4, 6	3–4	" "	600	Sk.	Mags. 7.0–8.5.
1903.364				280.8	0.96						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.282	Σ 1457	10 33 31	+ 6 15	319.8	1.39	4, 4	2	26-inch	600	Br.	
.315				320.4	1.32	4, 6	2	" "	600	Br.	
1900.352				316.2	1.70	4, 4	1–2	" "	600	See	
.357				314.9	1.54	4, 4	3	" "	600	See	
1897.298				320.1	1.36						
1900.354				315.6	1.62						
1903.352	Hn 108	10 34 16	−17 3	22.1	1.10	4, 6	4	26-inch	600	Sk.	Mags. 9.0–9.0.
.358				23.4	1.00	4, 6	3	" "	600	Sk.	Mags. 9.0–9.5.
.369				23.9	0.80	4, 6	3–4	" "	600	Sk.	Mags. 9.5–9.5.
1903.360				23.1	0.97						
1899.308	0Σ 224	10 34 28	+ 9 22	297.5	0.65	3, 4	3	26-inch	888	See	
.308				301.5	0.59	4, 4	3	" "	888	Br.	Image unsatisfactory.
.311				300.0	0.61	4, 4	3	" "	600	See	Images very good.
.314				306.9	0.51	4, 4	2	" "	888	Br.	
.341				311.0	0.58	4, 4	2	" "	888	Br.	
.369				300.0	0.47	4, 4	2	" "	888	Br.	
1900.357				308.7	0.53	4, 4	3	" "	600	See	
1902.293				294.4	0.56	5, 10	5	" "	600	D.	Separated.
1899.325				302.8	0.57						
1900.357				308.7	0.53						
1902.293				294.4	0.56						
1900.357	0Σ 225	10 34 40	+19 46	352.2	6.50	4, 6	3	26-inch	600	See	
1897.282	0Σ 227	10 36 25	+11 16	342.1	0.52	4, 4	2	26-inch	600	Br.	
.307				349.6	0.64	4, 4	2	" "	600	Br.	
.348				347.9	0.60	4, 4	2	" "	600	Br.	Difficult; clouds.
1897.312				346.5	0.59						
1903.325	Σ 1470	10 41 10	− 5 14	11.4	1.53	4, 6	2–3	26-inch	600	Sk.	Mags. 9.0–9.0.
.333				10.2	1.57	4, 6	4	" "	600	Sk.	Mags. 9.0–9.0.
.339				8.7	1.24	4, 6	2–3	" "	600	Sk.	Mags. 9.0–9.0.
.358				10.5	1.25	4, 6	3	" "	600	Sk.	
1903.339				10.2	1.40						
1897.351	0Σ 228	10 41 52	+23 6	188.5	0.40	4, 4	2	26-inch	600	Br.	
.384				188.0	0.43	4, 4	2	" "	600	Br.	
1897.368				188.2	0.42						
1897.353	0Σ 229	10 42 18	+41 38	323.1	0.87	4, 4	2	26-inch	600	Br.	
.378				324.1	0.93	4, 4	2	" "	600	Br.	
.384				320.4	0.83	4, 4	3	" "	600	Br.	
1897.372				322.5	0.88						
1903.358	β 595	10 43 8	−14 26	12.5	1.91	4, 6	3	26-inch	600	Sk.	Mags. 9.0–11.0.
1903.194	Σ 1476	10 44 13	− 3 30	1.4	2.30	4, 6	..	26-inch	600	D.	Mags. 7.0–7.7.
.229				1.1	2.49	4, 6	2	" "	600	Sk.	Mags. 8.0–9.0.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.325	Σ 1476 (Continued).....	10 44 13	− 3 30	3.4	1.93	4, 6	2–3	26-inch	600	Sk.	Mags. 7.5–7.5.
.330				1.6	1.89	4, 6	2–3	" "	600	Sk.	Mags. 8 0–9.0.
.341				4.2	1.97	4, 6	2–3	" "	600	Sk.	Mags. 7.0–8.0.
1903.284				2.3	2.12						
1903.333	β 111.....	10 46 10	− 8 34	6.9	3.29	4, 6	4	26-inch	600	Sk.	Mags. 10.0–10.0.
.339				6.5	3.62	4, 6	2–3	" "	600	Sk.	Mags. 10.0–10.0.
.358				5.4	3.49	4, 6	3	" "	600	Sk.	Mags. 9.5–9.5.
1903.343				6.3	3.47						
1900.357	0Σ 230.....	10 49 10	+21 18	15.9	8.54	4, 4	3	26-inch	600	See	
1900.357	Σ 1487=54 Leonis.....	10 50 12	+25 17	104.8	6.61	4, 4	3	26-inch	600	See	
1897.323	Σ 1500.....	10 54 56	− 2 56	315.6	1.22	4, 4	2	26-inch	600	Br.	
.326				312.8	1.57	4, 4	2	" "	600	Br.	
1900.357				309.6	1.75	4, 4	2	" "	600	See	
.371				306.9	1.80	4, 4	2	" "	600	See	Hazy and very blurred.
1903.194				310.5	1.64	4, 6	4	" "	600	Sk.	Mags. 7.5–8.5.
.273				309.8	1.69	4, 6	3	" "	600	Sk.	Mags. 8 5–9.0.
.325				312.1	1.95	4, 6	2–3	" "	600	Sk.	Mags. 7.0–7.0.
.330				310.0	1.67	4, 6	3	" "	600	Sk.	Mags. 7.5–8.0.
.347				309.5	1.69	4, 6	2–3	" "	600	Sk.	Mags. 8.0–8.0.
1897.324				314.2	1.40						
1900.364				308.2	1.78						
1903.294				310.4	1.73						
1903.339	Ⱨ I. 77.....	10 57 8	−15 9	16.1	2.77	4, 6	2–3	26-inch	600	Sk.	Mags. 8.5–8.5.
.341				17.8	2.88	4, 6	2–3	" "	600	Sk.	Mags. 9.0–9.0.
.344				16.7	2.85	4, 6	3	" "	600	Sk.	Mags. 9.0–9.5.
.352				18.3	3.03	4, 6	4	" "	600	Sk.	Mags. 8.5–8.5.
1903.344				17.2	2.88						
[illegible]	Howe 25.....	10 58 27	−26 59	333.3	2.34	4, 6	4	26-inch	600	Sk.	Mags. 8.5–9.5.
[illegible]				328.3	2.67	4, 6	3	" "	600	Sk.	Mags. 8.0–10.0.
[illegible]				332.3	2.50	4, 6	3	" "	600	Sk.	Mags. 8.0–10.5.
[illegible]				331.4	2.26	4, 6	3–4	" "	600	Sk.	Mags. 8.0–10.0.
[illegible]				331.3	2.44						
[illegible]	Σ [illegible]	10 59 56	+ 4 11	109.7	1.01	4, 4	2	26-inch	600	Br.	
[illegible]				108.2	1.10	4, 4	2	" "	600	Br	
[illegible]				104.6	1.52	4, 4	1–2	" "	600	See	Blurred; too bad to continue.
[illegible]				108.9	1.07	4, 4	4	" "	600	See	
[illegible]				109.0	1.06						
[illegible]				106.8	1.30						
[illegible]	[illegible]	11 1 48	+ 2 30	82.8	1.92	4, 6	2	26-inch	...	See	
[illegible]				82.7	1.09	4, 4	3–4	" "	600	See	
[illegible]				96.9	1.47	4, 8	2	" "	...	See	Hazy; very difficult.
[illegible]				88.5	2.07	4, 4	4	" "	600	See	Quite plain
[illegible]				82.8	1.50						
[illegible]				92.7	1.77						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.351	Σ 1517	11 8 26	+20 41	97.3	0.59	4, 4	2	26-inch	600	Br.	
.353				98.0	0.64	4, 4	2	" "	600	Br.	
.384				98.5	0.58	4, 4	2	" "	600	Br.	
1900.368				92.5	0.46	4, 4	2–3	" "	600	See	
.376				93.3	0.29	4, 4	4	" "	600	See	
1897.363				97.9	0.60						
1900.372				92.9	0.38						
1900.300	β 916=31 Crateris	11 9 4	−14 53	355.7	0.36	4, 4	3–4	26-inch	600	See	
.327				359.8	0.50	4, 4	3	" "	888	See	
1901.321				2.4	0.95	9, 8	4	" "	600	See	Divided at best moments.
1903.322				4.8	0.69	4, 6	..	" "	600	Fk.	Fuzzy.
1900.314				357.8	0.43						
1901.321				2.4	0.95						
1903.322				4.8	0.69						
1899.300	0Σ 232	11 9 34	+38 7	236.7	0.60	4, 4	3	26-inch	888	Br.	Clouds.
1900.300	β 600 = 36 Crateris (A and B)	11 11 54	− 6 35	192.2	1.17	4, 4	3–4	26-inch	600	See	
.316				194.0	0.52	4, 4	4	" "	785	See	
1900.308				193.1	0.84						
1900.300	(AB and C)			97.5	55.49	4, 4	3–4	26-inch	600	See	
.316				97.7	54.89	4, 6	4	" "	600	See	
1900.308				97.6	55.19						
1900.299	0Σ 233	11 12 40	+67 14	331.8	4.58	4, 8	..	12-inch	...	B.	
.316				334.8	4.56	4, 8	..	" "	...	B.	
1900.308				333.3	4.57						
1897.326	Σ 1523=ξ Urs. Majoris	11 12 51	+32 6	163.8	2.25	4, 4	2	26-inch	600	Br.	
.351				164.6	2.05	4, 4	2	" "	400	Br.	
.353				164.8	1.87	4, 4	3	" "	600	Br.	
.408				164.4	2.05	4, 6	2	" "	400	Br.	Unsteady.
1900.299				147.3	2.47	4, 8	..	12-inch	...	B.	
.376				152.2	2.48	8, 8	4	26-inch	600	See	
.499				154.4	2.97	4, 8	..	12-inch	...	B.	Mag. of each component about 4.
.543				149.3	2.40	4, 8	..	" "	...	B.	
1897.360				164.4	2.06						
1900.429				150.8	2.58						
1900.299	Σ 1527=339 Leonis	11 13 45	+14 49	15.6	2.93	4, 8	..	12-inch	...	B.	
.316				16.1	3.15	4, 8	..	" "	...	B.	
.368				15.0	3.53	4, 4	2	26-inch	600	See	
.376				16.0	3.50	4, 4	4	" "	600	B.	
1900.340				15.7	3.28						
1900.368	Σ 1534	11 16 36	+18 44	325.2	5.07	4, 4	2	26-inch	600	See	
.376				326.2	5.18	4, 4	4	" "	600	See	
1900.372				325.7	5.12						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.299	Σ 1536=ε Leonis	11 18 43	+11 5	50.5	2.70	4, 8	..	12-inch	...	B.	
.316				51.2	2.40	4, 8	..	" "	...	B.	
.368				57.3	2.78	4, 4	2	26-inch	600	See	
.376				52.6	2.73	4, 4	4	" "	600	See	
1900.340				52.9	2.65						
1900.316	β 26	11 18 43	− 9 52	65.2	2.82	4, 4	4	26-inch	600	See	
.324				66.8	2.91	4, 4	2–3	" "	400	See	
1903.229				73.4	3.22	4, 6	2	" "	600	Sk.	Mags. 7.5–9.5; white, blue.
.292				74.2	3.10	4, 6	3–4	" "	600	Sk.	Mags. 8.0–11.0; white, blue.
.295				67.6	2.96	4, 6	4	" "	600	Sk.	Mags. 8.0–10.0; white, blue.
.325				67.6	2.98	4, 6	3	" "	600	Sk.	Mags. 8.0–10.0.
1900.320				66.0	2.86						
1903.285				70.7	3.06						
1903.344	H 840=γ Crateris	11 19 53	−17 8	98.4	5.21	4, 6	3	26-inch	600	Sk.	Mags. 4.0–10.0.
.347				96.5	5.03	4, 6	2–3	" "	600	Sk.	
.350				98.0	4.99	4, 6	2–3	" "	600	Sk.	
.385				95.6	5.30	4, 6	2–3	" "	600	Sk.	
1903.356				97.1	5.13						
1900.299	Σ 1543=57 Urs. Majoris	11 23 41	+39 53	359.5	5.05	4, 8	..	12-inch	...	B.	
.316				356.1	5.70	4, 8	..	" "	...	B.	
.543				358.1	5.95	4, 8	..	" "	...	B.	
1900.386				357.9	5.57						
1903.350	Jacob 6	11 24 40	−23 55	81.6	8.35	4, 6	2–3	26-inch	600	Sk.	Mags. 6.0–10.0.
.352				80.5	8.22	4, 6	4	" "	600	Sk.	Mags. 6.5–9.5.
.360				81.9	8.44	4, 6	2–3	" "	600	Sk.	Mags. 5.0–9.0.
.385				80.3	8.34	4, 6	2–3	" "	600	Sk.	
1903.362				81.1	8.34						
1900.316	β 340	11 24 51	+ 3 46	6.9	4.59	4, 4	4	26-inch	600	See	
.324				5.2	3.86	4, 4	2–3	" "	400	See	
1900.320				6.0	4.22						
1897.384	0Σ 234	11 25 25	+41 50	129.4	0.31	4, 4	3	26-inch	888	Br.	
1899.308				137.0	0.26	5, 4	3	" "	888	Br.	
.325				137.1	0.42	4, 6	2	" "	888	Br.	
.328				137.3	0.36	7, 4	4	" "	888	Br.	
1897.384				129.4	0.31						
1899.320				137.1	0.35						
1897.422	0Σ 235	11 26 41	+61 38	106.1	0.59	4, 4	2	26-inch	600	Br.	Unsteady.
1899.325				118.7	0.60	4, 2	2	" "	600	Br.	Very poor.
.328				109.7	0.61	4, 4	3	" "	888	Br.	
.341				114.8	0.66	4, 4	2	" "	888	Br.	
1897.422				106.1	0.59						
1899.331				114.4	0.62						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.352	Ⱶ III. 96=17 Crateris...	11 27 19	−28 43	209.4	9.31	4, 6	4	26-inch	600	Sk.	
.360				209.3	9.25	4, 6	2–3	" "	600	Sk.	Mags. 6.0–6.5.
.369				208.6	8.86	4, 6	3	" "	600	Sk.	Mags. 6.0–6.0; unsteady.
1903.360				209.1	9.14						
1900.368	Σ 1552=90 Leonis	11 29 30	+17 21	208.6	3.15	4, 4	2	26-inch	600	See	
.376	(A and B)			208.6	3.32	4, 4	4	" "	600	See	
1902.279				207.4	3.80	5, 10	3	" "	400	D.	
1900.372				208.6	3.24						
1902.279				207.4	3.80						
1899.300	Σ 1555 (A and B).....	11 31 2	+28 20	349.0	0.41	6, 8	4	26-inch	888	Br.	
.308				349.2	0.37	4, 4	3	" "	888	Br.	
1900.324				345.8	0.25	4, 6	2–3	" "	888	See	
.327				349.0	0.35	4, 4	3	" "	888	See	
1899.304				349.1	0.39						
1900.326				347.4	0.30						
1900.425	Σ 1553.....	11 31 9	+56 41	166.5	5.86	4, 8	..	12-inch	...	B.	
.475				171.8	5.86	4, 8	..	" "	...	B.	
1900.450				169.2	5.86						
1900.376	β 456.....	11 31 45	−11 48	273.1	0.31	4, 4	4	26-inch	600	See	
1903.322	Σ 1560.....	11 33 18	− 1 53	280.5	5.01	4, 6	..	26-inch	600	Fk.	Mags. 5.5–9.5; unsteady.
.330				280.5	5.66	4, 6	3	" "	600	Sk.	Mags. 7.0–10.0; white, blue.
.339				281.8	5.48	4, 6	3	" "	600	Sk.	Mags. 6.5–10.0; yellowish, blue.
.350				279.0	5.25	4, 6	2–3	" "	600	Sk.	Mags. 6.0–10.0.
1903.335				280.4	5.35						
1897.373	0Σ 237.....	11 33 39	+41 42	264.3	1.33	4, 4	2	26-inch	600	Br.	
.378				265.1	1.24	4, 4	2	" "	600	Br.	
.455				264.6	1.29	4, 4	2	" "	600	Br.	
1897.402				264.7	1.29						
1903.352	H 4478=β Hydræ	11 47 51	−33 21	355.4	1.77	4, 6	4	26-inch	600	Sk.	Mags. 5.0–5.5; yellow, blue.
.369				349.6	1.42	4, 6	2–3	" "	600	Sk.	Mags. 6.0–6.0.
1903.360				352.5	1.60						
1899.328	β 794 (A and B).....	11 48 19	+74 19	168.9	0.34	4, 4	3	26-inch	888	Br.	
.341				170.8	0.32	4, 4	2	" "	888	Br.	
1899.334				169.8	0.33						
1899.284	0Σ 241.....	11 51 8	+36 0	127.2	1.61	4, 4	2	26-inch	600	Br	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0.	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.324	β 918	11 51 38	+32 46	230.3	7.01	4, 6	2–3	26-inch	600	See	Excessively difficult.
.376				[243.4]	7.60	4, 4	4	" "	600	See	Position angle probably wrong.
1900.350				230.3	7.30						
1903.339	H 4481	11 52 12	−21 59	194.4	3.62	4, 6	3	26-inch	600	Sk.	Mags. 7.0–7.0.
.341				195.8	3.50	4, 6	2–3	" "	600	Sk.	Mags. 8.0–8.0.
.344				194.6	3.66	4, 6	2	" "	600	Sk.	Mags. 8.5–9.0; clouds.
.350				196.5	3.43	4, 6	3	" "	600	Sk.	Mags. 8.5–8.5.
1903.344				195.3	3.55						
1897.477	0Σ 243	11 54 40	+53 57	9.3	0.99	4, 4	2	26-inch	600	Br.	
1900.324	β 457	11 56 16	−20 58	76.4	0.87	4, 4	2–3	26-inch	600	See	
1900.368	Σ 1593	11 58 25	− 1 53	15.7	1.34	4, 4	2	26-inch	600	See	
.376				16.8	1.34	4, 4	4	" "	600	See	
1903.194				16.4	1.48	4, 6	4	" "	600	Sk.	Mags. 8.5–8.5.
.273				15.1	1.34	4, 6	3	" "	600	Sk.	Mags. 9.0–9.2.
.292				13.2	1.43	4, 6	3–4	" "	600	Sk.	Mags. 9.0–9.0.
.295				10.7	1.37	4, 6	3	" "	600	Sk.	Mags. 8.5–8.5.
.322				14.2	1.29	4, 6	..	" "	600	Fk.	Mags. 8.0–8.0; unsteady.
.325				14.9	1.35	4, 6	2–3	" "	600	Sk.	Mags. 9.0–9.0.
1900.372				16.2	1.34						
1903.284				14.1	1.38						
1900.368	Σ 1596=2 Comæ	11 59 9	+22 1	239.8	3.88	4, 4	2	26-inch	600	See	
.390				240.4	3.94	4, 4	2–3	" "	600	See	
.425				238.5	3.89	4, 8	..	12-inch	...	B.	
.499				240.3	3.61	4, 8	..	" "	...	B.	
1902.279				233.6	3.99	5, 10	3	26-inch	400	D.	
1900.420				239.8	3.83						
1902.279				233.6	3.99						
1900.324	β 458	11 59 10	−20 29	233.4	31.14	4, 4	2–3	26-inch	600	See	
1903.292	β 412	12 3 13	−18 1	160.2	2.26	4, 6	3–4	26-inch	600	Sk.	Mags. 8.0–9.0.
.295				160.8	2.14	4, 6	3	" "	600	Sk.	Mags. 8.5–9.5.
.339				161.1	2.22	4, 6	3	" "	600	Sk.	Mags. 8.5–8.5.
.350				163.4	2.20	4, 6	2–3	" "	600	Sk.	Mags. 8.0–8.5.
1904.404				162.5	2.30	4, 6	2	" "	400	Sk.	
1903.319				161.4	2.20						
1904.404				162.5	2.30						
1900.387	Σ 1604=59 Virginis (A and B)	12 4 18	−11 18	91.2	11.22	4, 4	2	26-inch	600	See	
.390				90.3	11.01	4, 4	1–2	" "	600	See	
1903.330				92.2	11.47	4, 6	2–3	" "	600	Sk.	Mags. 7.0–10.0.
.341				91.6	10.83	4, 6	2–3	" "	600	Sk.	Mags. 7.0–10.0.
.344				91.9	11.11	4, 6	3	" "	600	Sk.	Mags. 7.0–9.0
.350				92.4	10.98	4, 6	3	" "	600	Sk.	Mags. 7.0–10.0.
1900.388				90.8	11.12						
1903.341				92.0	11.10						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.387	Σ 1604—(Continued)	12 4 18	−11 18	90.8	36.84	4, 4	1–2	26-inch	600	See	
.390	(A and C)			90.7	36.70	4, 4	2	" "	600	See	
1900.388				90.8	36.77						
1897.373	Σ 1606	12 5 44	+40 27	336.0	1.13	4, 4	2	26-inch	600	Br.	
.422				333.0	0.93	4, 4	2	" "	{600 400}	Br.	Seeing poor.
.430				336.2	1.13	4, 4	3	" "	600	Br.	Clouds; unsteady.
1897.408				335.1	1.06						
1903.339	S 634	12 6 15	−16 14	282.5	6.61	4, 6	3	26-inch	600	Sk.	Mags. 7.0–10.0.
.341				283.8	6.53	4, 6	2–3	" "	600	Sk.	Mags. 7.5–9.5.
.350				284.9	6.71	4, 6	3	" "	600	Sk.	Mags. 7.0–9.0.
.352				283.5	6.49	4, 6	4	" "	600	Sk.	Mags. 7.0–8.5.
1903.346				283.7	6.58						
1903.330	Σ 1619	12 10 0	− 6 42	280.4	7.60	4, 6	2–3	26-inch	600	Sk.	Mags. 8.0–8.0.
.350				279.7	7.71	4, 6	3	" "	600	Sk.	Mags. 8.5–8.5.
.358				280.5	7.63	4, 6	3	" "	600	Sk.	Mags. 8.0–8.0.
.369				279.9	7.61	4, 6	2–3	" "	600	Sk.	Mags. 7.5–7.5.
1903.352				280.1	7.64						
1903.423	β 920=17 Corvi	12 10 36	−22 48	267.4	0.93	4, 6	4	26-inch	600	Sk.	Mags. 7.0–8.0.
.434				265.3	0.83	4, 6	4	" "	600	Sk.	Mags. 7.5–8.5.
1903.428				266.4	0.88						
1897.419	Σ 1621	12 10 54	+ 6 12	136.5	2.64	4, 4	2	26-inch	400	Br.	
1903.423	β 605	12 15 0	−21 37	136.2	0.99	4, 6	3	26-inch	600	Sk.	Mags. 8.0–9.0; difficult.
1900.327	Σ 1639=68 Comæ	12 19 26	+26 8	347.8	0.26	4, 4	3	26-inch	888	See	Exceedingly difficult.
.368				360.5	0.14	4, 4	2	" "	600	See	Mags. 8.0 – 8.2; fine double.
.376				360.6	0.30	4, 4	4	" "	600	See	
.390				356.6	0.26	4, 4	2	" "	600	See	Mags. 7.5–8.5.
1900.365				356.4	0.24						
1897.455	Σ 1641	12 19 36	+38 17	34.2	9.56	4, 4	2	26-inch	400	Br.	
1899.432	β 606=35 Corvi	12 20 50	−14 24	101.0	1.19	4, 4	2	26-inch	600	Br.	
.432				100.9	1.45	4, 4	2	" "	600	See	
1900.324				92.0	0.88	4, 4	2–3	" "	600	See	
1899.432				101.0	1.32						
1900.324				92.0	0.88						
1903.360	Hn°13	12 21 21	− 1 20	149.3	1.47	4, 6	2–3	26-inch	600	Sk.	Mags. 9.5–9.5.
.369				150.6	1.53	4, 6	4	" "	600	Sk.	Mags. 9.5–9.5.
.385				148.8	1.43	4, 6	3	" "	600	Sk.	Mags. 9.5–10.0.
.421				149.0	1.44	4, 6	3	" "	600	Sk.	
1903.384				149.4	1.47						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.408	Σ 1643	12 22 13	+27 35	40.2	1.82	4, 4	2	26-inch	400	Br.	
1903.325	β 28	12 24 56	−12 50	5.8	1.63	4, 6	2–3	26-inch	600	Sk.	Mags. 6.0–10.0.
.369				13.7	1.63	4, 6	3	" "	600	Sk.	Mags. 7.0–10.0.
.385				9.9	1.45	4, 6	3	" "	600	Sk.	Mags. 7.0–11.0.
.434				10.0	1.67	4, 6	3	" "	600	Sk.	Mags. 6.0–10.0.
1903.378				9.8	1.60						
1897.419	Σ 1647=191 Virginis	12 25 29	+10 16	220.9	1.29	4, 6	2	26-inch	400	Br.	
1900.368				222.9	1.62	4, 4	2	" "	600	See	
.387				223.9	1.54	4, 4	2	" "	600	See	
1897.419				220.9	1.29						
1900.378				223.4	1.58						
1899.432	β 797 (A and B)	12 29 27	+ 6 31	171.1	0.73	4, 4	2	26-inch	600	Br.	
.432				171.2	0.97	4, 4	2	" "	600	See	
1900.324				166.3	0.60	4, 4	2–3	" "	600	See	
1899.432				171.2	0.85						
1900.324				166.3	0.60						
1900.324	(AB and C)			3.0	77.34	4, 4	2–3	26-inch	600	See	
1897.419	Σ 1658	12 30 2	+ 8 0	356.8	2.58	4, 4	2	26-inch	400	Br.	
1900.368				357.2	2.48	4, 4	2	" "	600	See	
.387				354.1	2.42	4, 4	2–1	" "	600	See	
1897.419				356.8	2.58						
1900.378				355.6	2.45						
1897.419	Σ 1661	12 30 57	+11 58	236.7	2.54	4, 4	3	26-inch	400	Br.	
1900.387				239.5	2.37	4, 4	2	" "	600	See	
.390				236.8	2.64	4, 4	2	" "	600	See	
1897.419				236.7	2.54						
1900.388				238.2	2.50						
1897.419	Σ 1668=270 Virginis	12 35 50	+ 9 23	194.6	1.39	4, 4	3	26-inch	400	Br.	
.444				193.7	1.71	4, 6	2	" "	600	Br.	
1897.432				194.2	1.55						
1900.387	Σ 1669=58 Corvi (A and B)	12 36 4	−12 28	303.5	5.82	4, 4	1	26-inch	600	See	Too unsteady to continue.
.390				305.8	5.96	4, 4	2	" "	600	See	
1903.330				304.5	5.76	4, 6	2–3	" "	600	Sk.	Mags. 6.0–6.0.
.360				306.1	5.74	4, 6	2–3	" "	600	Sk.	Mags. 5.5–5.5.
.418				305.8	5.68	4, 6	2–3	" "	600	Sk.	
.421				305.2	5.74	4, 6	2–3	" "	600	Sk.	
.423				305.9	5.89	4, 6	4	" "	600	Sk.	Mags. 6.0–6.0.
1900.388				304.6	5.89						
1903.390				305.5	5.76						
1900.390	(A and C)			233.7	60.01	4, 4	2	26-inch	600	See	Mag. of C 11.0.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1899.547	Σ 1670=γ Virginis	12 36 36	− 0 54	327.7	5.89	4, 6	5	12-inch	...	See	
.549	(A and B)			328.0	5.82	4, 8	4	" "	...	See	
1900.332				329.2	5.78	4, 4	4	26-inch	600	See	
.335				329.2	6.05	4, 4	2	" "	600	See	
1901.422				330.0	6.07	4, 8	4	" "	600	See	
.425				329.7	6.08	4, 8	4	" "	600	See	
1903.330				331.1	6.06	4, 6	2–3	" "	600	Sk.	
.418				328.6	6.16	4, 6	2–3	" "	600	Sk.	
.421				327.9	6.05	4, 6	2–3	" "	600	Sk.	
.423				327.6	5.94	4, 6	3	" "	600	Sk.	
1899.548				327.8	5.86						
1900.334				329.2	5.92						
1901.424				329.8	6.08						
1903.398				328.8	6.05						
1900.327	β 924=31 Virginis.....	12 36 53	+ 7 21	27.7	4.26	4, 6	2	26-inch	888	See	
1901.422				32.4	4.07	4, 8	4	" "	600	See	
.425				30.7	4.01	4, 8	4	" "	600	See	
1900.327				27.7	4.26						
1901.424				31.6	4.04						
1900.390	Σ 1687=35 Comæ.....	12 48 22	+21 47	78.4	1.18	4, 4	2–3	26-inch	600	See	Difficult.
	(A and B)										
1900.390	(A and C)			126.0	28.93	4, 4	2–3	26-inch	600	See	
.486				123.9	28.79	4, 8	..	12-inch	...	B.	
.499				126.6	28.61	4, 8	..	" "	...	B.	
1900.458				125.5	28.78						
1903.295	Σ 1690.....	12 51 5	− 4 19	150.3	6.01	4, 6	3	26-inch	600	Sk.	Mags. 7.0–9.5.
.325				149.0	6.10	4, 6	2–3	" "	600	Sk.	Mags. 6.0–9.0.
.330				152.2	5.95	5, 6	2–3	" "	600	Sk.	Mags. 8.5–10.0.
.418				149.9	5.93	4, 6	3	" "	600	Sk.	
1903.342				150.4	6.00						
1897.474	0Σ 256.....	12 51 19	− 0 25	72.5	0.56	4, 4	2	26-inch	600	Br.	
1900.428				79.3	0.77	4, 4	3–4	" "	600	See	Seeing very unsteady; sky thick.
1900.486	0Σ 257.....	12 52 10	+46 9	355.5	12.77	4, 8	..	12-inch	...	B.	
.499				355.3	13.27	4, 8	..	" "	...	B.	
.543				353.4	12.86	4, 8	..	" "	...	B.	
1900.509				354.7	12.97						
1903.292	O. Stone 27.....	12 52 35	−12 36	68.6	2.77	4, 6	3–4	26-inch	600	Sk.	Mags. 8.0–9.0.
.295				71.0	2.17	4, 6	3	" "	600	Sk.	Mags. 8.0–8.0.
.325				67.6	2.16	4, 6	3	" "	600	Sk.	Mags. 9.0–9.5.
.385				67.3	2.31	4, 6	4	" "	600	Sk.	Mags. 9.5–9.5.
1903.324				68.6	2.35						
1901.422	β 926.....	12 53 16	− 5 30	270.4	2.69	4, 8	4	26-inch	600	See	
.425				270.8	2.40	4, 8	4	" "	600	See	
1901.424				270.6	2.54						

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1901.422	β 112 (B and C)	12 55 45	+18 55	293.3	2.28	4, 8	4	26-inch	600	See	
.425				292.8	2.30	4, 8	4	" "	600	See	
1901.424				293.0	2.29						
1901.422	(A and B)			349.6	149.72	4, 8	4	26-inch	600	See	
.425				349.7	149.84	4, 4	4	" "	600	See	
1901.424				349.6	149.78						
1900.357	Σ1707	12 56 17	+16 24	36.5	9.59	4, 8	g	12-inch	...	B.	
.475				37.4	10.53	4, 8	..	" "	...	B.	
.543				36.6	10.03	4, 8	..	" "	...	B.	Difficult.
1900.458				36.8	10.05						
1901.422	β 928 (A and B)	12 58 12	− 5 54	311.5	2.43	4, 8	3	26-inch	600	See	
1903.295				311.1	2.27	4, 6	3–4	" "	600	Sk.	Mags. 8.0–9.5.
.319				308.6	2.09	4, 6	3	" "	600	Sk.	Mags. 9.0–10.0
.418				310.1	1.91	4, 6	2	" "	600	Sk.	
1901.422				311.5	2.43						
1903.344				309.9	2.09						
1901.422	(A and C)			222.7	64.82	4, 8	3	26-inch	600	See	Hazy.
1899.311	0Σ 260	13 3 15	+27 49	124.3	0.97	4, 4	3	26-inch	600	See	
.369				121.6	0.71	4, 4	2	" "	888	Br.	
1899.340				123.0	0.84						
1900.357	Σ 1722=179 Comæ	13 3 30	+16 2	334.6	3.38	4, 8	g	12-inch	...	B.	
.475				336.8	3.31	4, 8	..	" "	...	B.	
1900.416				335.7	3.34						
1903.330	Σ 1724=θ Virginis (A and B)	13 4 46	− 5 0	342.0	6.81	4, 6	2–3	26-inch	600	Sk.	
.421				341.0	6.90	4, 6	2–3	" "	600	Sk.	
.423				341.4	7.07	4, 6	3	" "	600	Sk.	
.434				341.0	7.05	4, 6	4	" "	600	Sk.	
1903.402				341.4	6.96						
1899.396	Σ 1728=42 Comæ	13 5 8	+18 3	5.7	0.30	4, 4	3	26-inch	785	Br.	Not separated.
.399				9.6	0.24	4, 4	4	" "	888	Br.	
.399				4.2	0.21	4, 4	4	" "	888	See	Elongated.
1899.398				6.5	0.25						
1901.422	β 609	13 5 30	− 4 24	335.9	0.50	4, 8	3	26-inch	600	See	
1897.474	0Σ 261	13 7 20	+32 37	346.7	1.53	4, 4	2	26-inch	600	Br.	
1900.527				343.2	1.88	4, 8	g	12-inch	...	B.	
.532				343.2	1.80	4, 8	..	" "	...	B.	
1897.474				346.7	1.53						
1900.530				343.2	1.84						

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DOUBLE STARS—Continued

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.421	Sh 161=54 Virginis.....	13 8 6	−18 18	32.6	5.44	4,6	3	26-inch	600	Sk.	⊞ II. 45.
.434				32.4	5.48	4,6	4	" "	600	Sk.	Mags. 7.0–8.0.
1903.428				32.5	5.46						
1903.421	β 342.....	13 9 53	−18 23	34.1	4.29	4,6	3	26-inch	600	Sk.	Mags. 8.5–9.5.
.434				32.4	3.97	4,6	4	" "	600	Sk.	Mags. 8.5–9.5.
1903.428				33.2	4.13						
1899.434	β 800=201 Comæ.....	13 11 51	+17 33	111.5	2.52	4,4	3	26-inch	600	Br.	
1903.434	Σ 1738.....	13 17 55	−14 24	281.3	4.07	4,6	4	26-inch	600	Sk.	Mags. 9.0–9.5.
1899.434	β 237.....	13 21 58	+14 54	203.9	2.87	4,4	2	26-inch	600	Br.	
1899.333	0Σ 267.....	13 23 30	+76 30	136.0	0.32	4,4	2	26-inch	888	Br.	Clouds; very faint.
1899.434	β 113.....	13 24 10	+12 0	206.0	1.30	4,4	3	26-inch	600	Br.	
1899.311	0Σ 269.....	13 28 20	+35 25	222.9	0.36	4,4	3	26-inch	600	See	
.311				230.9	....	4,..	2	" "	600	Br.	
.328				224.6	0.39	4,4	2	" "	888	Br.	
1899.317				226.1	0.38						
1903.421	β 114.....	13 29 3	− 8 6	137.7	1.43	4,6	3	26-inch	600	Sk.	Mags. 7.0–7.5.
.423				139.0	1.44	4,6	4	" "	600	Sk.	Mags. 8.0–8.5.
.434				139.2	1.15	4,6	4	" "	600	Sk.	Mags. 8.5–8.5.
1903.426				138.6	1.34						
1899.426	β 932=550 Virginis.....	13 29 21	−12 42	93.8	0.37	4,4	2	26-inch	888	Br.	Very poor.
.429	(A and B)			93.6	0.38	4,4	2	" "	888	Br.	
.429				99.8	0.29	4,4	2	" "	888	See	
1899.428				95.7	0.35						
1899.434	β 933 (A and B).....	13 30 1	+33 39	29.1	2.23	4,4	3	26-inch	600	Br.	
1899.434	(A and C).....			17.7	33.93	4,6	3	26-inch	600	Br.	
1903.273	Σ 1763=81 Virginis.....	13 32 21	− 7 22	39.8	3.08	4,6	3	26-inch	600	Sk.	⊞ I. 80; mags. 8.0–9.0.
.330				40.4	2.40	4,6	3	" "	600	Sk.	Mags. 8.5–8.5.
.421				39.2	2.86	4,6	3	" "	600	Sk.	Mags. 7.0–8.0.
.423				40.3	2.71	4,6	4	" "	600	Sk.	Mags. 8.0–8.5.
1903.362				39.9	2.76						
1899.311	Σ 1768=25 Can. Ven....	13 33 1	+36 48	128.7	1.41	4,6	2	26-inch	600	See	
.311				128.6	1.43	4,4	2	" "	600	Br.	
1899.311				128.6	1.42						

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.527	Σ 1771	13 34 4	+70 17	71.8	2.11	4, 8	g	12-inch	...	B.	
.532				78.9	2.24	4, 8	..	" "	...	B.	
1900.530				75.4	2.18						
1899.341	β 612	13 34 39	+11 15	220.6	0.35	5, 4	2	26-inch	888	Br.	
.369				225.0	0.32	4, 4	2	" "	888	Br.	
.369				232.9	0.29	4, 6	2	" "	888	See	
1899.360				226.2	0.32						
1900.527	Σ 1776	13 37 40	+46 44	199.2	7.16	4, 8	g	12-inch	...	B.	
.532				196.7	6.95	4, 8	..	" "	...	B.	
1900.530				198.0	7.06						
1897.466	Σ 1781	13 41 6	+ 5 37	271.0	1.00	4, 4	2	26-inch	600	Br.	
1899.369				268.2	1.43	4, 4	2	" "	600	See	
.369				275.3	1.08	5, 4	2	" "	600	Br.	
.388				272.9	1.05	4, 4	3	" "	600	Br.	
1897.466				271.0	1.00						
1899.375				272.1	1.19						
1897.466	Σ 1785	13 44 31	+27 29	266.3	1.45	4, 4	2	26-inch	600	Br.	
1900.527				277.1	1.94	4, 8	g	12-inch	...	B.	
.532				273.9	1.97	4, 8	..	" "	...	B.	
1897.466				266.3	1.45						
1900.530				275.5	1.96						
1907.435	Skinner [B. D. −15° 3755]	13 47 12	−15 40	344.6	3.63	4, 6	p	26-inch	600	R.	Mags. 8.8–10.7.
1900.267	Skinner 7	13 48 46	−14 38	292.2	2.75	4, 8	..	12-inch	...	B.	
.299				297.1	2.13	4, 8	..	" "	...	B.	Very difficult.
1900.283				294.6	2.44						
1903.423	Σ 1788	13 49 43	− 7 34	80.5	2.84	4, 6	4	26-inch	600	Sk.	Mags. 6.0–7.5.
.434				77.4	2.78	4, 6	4	" "	600	Sk.	Mags. 6.0–7.0.
.497				79.9	2.68	4, 6	2	" "	600	Sk.	Mags. 6.0–7.0.
.500				77.7	2.89	4, 6	4	" "	600	Sk.	Mags. 6.5–7.5.
1903.464				78.9	2.80						
1897.474	0Σ 273	13 51 19	+ 5 47	109.2	0.91	4, 4	2	26-inch	600	Br.	Distance somewhat uncertain.
1903.462	Σ 1799	13 59 34	− 6 4	295.8	4.34	4, 6	4	26-inch	600	Sk.	Mags. 8.0–9.0.
.497				295.9	4.38	4, 6	3–4	" "	600	Sk.	Mags. 8.0–8.5.
1903.480				295.8	4.36						
1903.497	Σ 1802	14 2 40	−12 27	281.8	5.11	4, 6	3–4	26-inch	600	Sk.	Mags. 8.0–9.0.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.462	Hn 16	14 3 11	− 3 4	218.0	3.46	4, 6	4	26-inch	600	Sk.	Mags. 10.0–10.0; hazy.
.497				216.0	2.94	4, 6	4	" "	600	Sk.	Mags. 9.3–9.8.
1903.480				217.0	3.20						
1900.357	Skinner 8	14 5 24	−14 20	326.5	13.58	4, 8	g	12-inch	...	B.	
.425				324.6	12.78	4, 8	..	" "	...	B.	
1903.319				327.0	14.03	4, 6	3	26-inch	600	Sk.	Mags. 9.3–10.0.
1900.391				325.6	13.18						
1903.319				327.0	14.03						
1899.328	0Σ 278	14 8 18	+44 40	94.8	0.33	4, 4	3	26-inch	888	Br.	
1900.497	Σ 1813	14 8 24	+ 5 52	[186.1]	5.35	4, 8	..	12-inch	...	B.	Position angle probably 10° wrong; not well separated.
.499				196.8	4.85	4, 8	..	" "	...	B.	
.543				195.7	4.49	4, 8	..	" "	...	B.	
1900.513				196.2	4.90						
1899.429	β 939 (A and B)	14 8 51	− 8 3	136.0	0.58	4, 4	2	26-inch	600	See	
.429				140.5	0.56	4, 4	2	" "	888	Br.	
1899.429				138.2	0.57						
1900.532	Σ 1816	14 9 28	+29 34	81.4	2.01	4, 8	..	12-inch	...	B.	
.543				80.6	1.71	4, 8	..	" "	...	B.	
1900.538				81.0	1.86						
1897.477	Σ 1820	14 9 44	+55 48	74.5	2.22	4, 4	2	26-inch	600	Br.	
1900.532				79.9	2.29	4, 8	..	12-inch	...	B.	
.543				81.8	2.52	4, 8	..	" "	...	B	
.573				82.3	2.29	4, 8	..	" "	...	B.	
1897.477				74.5	2.22						
1900.549				81.3	2.37						
1897.474	Σ 1819	14 10 18	+ 3 36	1.4	1.36	4, 4	2	26-inch	600	Br.	
1897.466	0Σ 281	14 15 25	+ 9 2	157.6	1.61	5, 4	2	26-inch	400	Br.	
1897.455	Σ 1837	14 19 18	−11 13	308.9	1.50	4, 4	2	26-inch	400	Br.	
1903.497				301.2	1.27	4, 6	2–3	" "	600	Sk.	Mags. 7.0–8.0.
1903.497	β 225 (B and C)	14 19 52	−19 31	98.8	1.19	4, 6	2	26-inch	600	Sk.	Mags. 8.5–10.0.
1897.521	Σ 1842	14 21 57	+ 4 8	15.1	2.82	4, 4	1–2	26-inch	600	Br.	
1903.497	β 462 (A and B)	14 24 48	− 3 16	323.8	2.07	4, 6	3	26-inch	600	Sk.	Mags. 9.5 – 10.0; hazy.
1899.330	β 117	14 25 49	−15 11	92.2	2.51	4, 4	3	26-inch	600	Br.	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1900.497	Σ 1858	14 29 30	+36 1	44.2	3.57	4, 8	p	12-inch	...	B.	
.527				35.3	3.02	4, 8	g	" "	...	B.	
.573				39.4	2.40	4, 8	..	" "	...	B.	
1901.499				34.8	2.66	4, 8	..	26-inch	400	La.	
1900.532				39.6	3.00						
1901.499				34.8	2.66						
1899.557	Σ 1864=π Bootis	14 36 2	+16 51	104.8	6.08	8, 16	4	12-inch	...	See	
1900.497				101.2	6.59	4, 8	p	" "	...	B.	
.527				104.0	6.57	4, 8	g	" "	...	B.	
1899.557				104.8	6.08						
1900.512				102.6	6.58						
1899.399	Σ 1865=ζ Bootis	14 36 22	+14 9	161.4	0.22	3, 4	3	26-inch	888	See	
1897.499	Σ 1866	14 36 52	+ 9 57	23.0	0.80	4, 4	2–1	26-inch	600	Br.	Very faint and unsteady.
1901.441	β 807	14 37 41	− 6 23	242.0	1.30	4, 8	4	26-inch	600	See	
1897.477	Σ 1871	14 38 17	+51 50	292.4	1.83	4, 4	2	26-inch	600	Br.	
1900.497				289.2	2.39	4, 8	p	12-inch	...	B.	
.527				294.6	2.06	4, 8	g	" "	...	B.	
1897.477				292.4	1.83						
1900.512				291.9	2.22						
1899.544	Σ 1877=ε Bootis	14 40 37	+27 30	327.5	3.63	4, 8	3	12-inch	...	See	
.547				327.6	2.96	4, 6	5	" "	...	See	
.557				327.5	2.80	4, 8	4	" "	...	See	
1900.617				326.3	3.09	4, 8	..	" "	...	B.	
.650				331.3	2.97	4, 8	..	" "	...	B.	
.658				323.1	3.41	4, 8	..	" "	...	B.	
1899.549				327.5	3.13						
1900.642				326.9	3.16						
1897.521	Σ 1876	14 41 4	− 6 58	74.4	1.45	4, 4	1–2	26-inch	600	Br.	
1903.497				74.2	1.27	4, 6	3	" "	600	Sk.	Mags. 8.5–9.0.
1897.510	Σ 1879	14 41 23	+10 5	149.9	0.44	4, 4	2	26-inch	600	Br.	
.523				148.0	0.59	4, 4	2	" "	600	Br.	
1899.300				139.1	0.48	4, 4	3	" "	888	Br.	
.308				140.2	0.50	4, 1	2	" "	600	Br.	
.311				138.8	0.66	4, 4	3	" "	600	See	
311				.....	0.46	.,4	3	" "	600	Br.	
421				138.2	0.40	4, 4	2	" "	888	Br.	
[illegible]				149.0	0.52						
[illegible]				139.1	0.50						
[illegible]	[illegible]	14 41 44	+42 48	137.5	0.36	4, 4	3	26-inch	785	Br.	
[illegible]				135.9	0.28	4, 4	2	" "	888	Br.	
[illegible]				136.7	0.32						
[illegible]	[illegible]	14 42 57	−16 55	247.5	1.65	4, 8	4	26-inch	600	See	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.515	Σ 1883	14 43 55	+ 6 22	63.6	0.58	4, 4	2	26-inch	600	Br.	
1901.441				66.4	0.52	4, 8	4	" "	600	See	Mags. about equal; nicely divided.
1897.589	Σ 1884=286 Bootis	14 43 58	+24 47	55.2	1.69	4, 4	1–2	26-inch	600	Br.	
1897.466	Σ 1888=ξ Bootis	14 46 47	+19 31	218.7	2.94	4, 4	2	26-inch	400	Br.	
.474				219.3	2.90	4, 4	2	" "	400	Br.	
1899.412				208.8	2.56	4, 6	2	" "	600	Br.	Clouds.
.421				208.6	2.72	6, 4	3	" "	600	Br.	Companion reddish.
.423				208.3	2.74	4, 6	3	" "	600	Br.	
.429				205.2	3.02	4, 8	3	" "	600	See	
.429				208.6	2.90	4, 4	3	" "	600	Br.	
.432				209.5	2.98	8, 8	2	" "	600	See	Companion reddish.
.544				208.5	3.22	4, 6	3	12-inch	...	See	
.549				209.6	3.30	4, 8	1	" "	...	See	Clouds.
1901.592				196.2	2.71	5, 10	3	26-inch	400	See	
1902.525				191.3	2.74	5, 10	4	" "	600	See	
.525				194.4	2.60	5, 10	g	" "	600	Fk.	
.525				191.5	2.72	5, 10	g	" "	600	D.	
1897.470				219.0	2.92						
1899.455				208.4	2.93						
1901.592				196.2	2.71						
1902.525				192.4	2.69						
1897.477	0Σ 287	14 47 51	+45 20	138.7	0.68	4, 4	2	26-inch	600	Br.	
1897.499	0Σ 288	14 48 42	+16 7	189.6	1.64	4, 4	2	26-inch	600	Br.	
1900.532				189.1	2.22	4, 8	..	12-inch	...	B.	Seen quite well; not yet dark.
.573				194.8	1.35	4, 8	..	" "	...	B.	
.612				194.2	1.69	4, 8	..	" "	...	B.	Fainter than supposed.
1897.499				189.6	1.64						
1900.572				192.7	1.75						
1899.557	0Σ 289	14 51 50	+32 42	119.2	4.66	4, 8	4	12-inch	...	See	
1901.441	β 239=59 Hydræ	14 52 44	−27 15	313.1	1.08	4, 8	4	26-inch	600	See	Mags. 6.0–7.0; divided at best moments.
1901.441	β 808 (A and B)	14 52 51	− 8 17	189.6	0.52	4, 8	4	26-inch	600	See	Mags. 10.0–10.0.
1901.441	(AB and C)			305.5	93.77	4, 8	4	26-inch	600	See	
1899.300	β 348=2 Serpentis	14 56 42	+ 0 15	119.2	0.59	4, 4	2	26-inch	888	Br.	
.388				122.3	0.75	5, 4	2	" "	600	Br.	
1899.344				120.8	0.67						
1903.514	β 119	15 0 14	− 6 38	301.8	1.89	4, 6	3	26-inch	600	Sk.	Mags. 7.5–8.0.
.517				302.0	1.70	4, 6	3	" "	600	Sk.	Mags. 8.0–8.5.
.519				302.0	1.71	4, 6	3	" "	600	Sk.	Mags. 8.0–8.5.
1903.517				301.9	1.77						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1907.517	Howe 37	15 35 26	−14 30	89.9	5.52	4, 6	f–g	26-inch	400	R.	Mags. 9.0–9.0.
1900.584	Σ 1965=ζ Coronæ	15 35 37	+36 58	305.2	6.50	4, 8	..	12-inch	...	B.	
.590				304.3	6.39	4, 8	..	" "	...	B.	
.658				304.6	6.43	4, 8	..	" "	...	B.	
1900.611				304.7	6.44						
1903.514	β 35	15 37 9	−15 42	100.6	2.50	4, 6	3–4	26-inch	600	Sk.	Mags. 8.0–10.0.
.519				101.6	2.74	4, 6	3	" "	600	Sk.	Mags. 7.0–9.5.
1903.516				101.1	2.62						
1897.616	Σ 1967=γ Coronæ	15 38 33	+26 37	120.3	0.60	4, 4	3	26-inch	888	Br.	
.619				120.5	0.65	4, 4	2–3	" "	600	Br.	
1899.547				116.0	1.14	4, 8	5	12-inch	...	See	Clearly divided.
.582				117.3	0.60	8, 14	5	" "	...	See	Clearly divided.
1897.618				120.4	0.62						
1899.564				116.6	0.87						
1899.401	Σ 1969	15 39 24	+60 18	54.3	0.63	5, 6	1	26-inch	600	Br.	
1903.514	Σ 1974	15 43 59	− 2 56	162.9	2.56	4, 6	4	26-inch	600	Sk.	Mags. 9.0–9.0.
.519				161.7	2.52	4, 6	4	" "	600	Sk.	Mags. 9.0–9.0.
1903.516				162.3	2.54						
1895.549	Skinner 9	15 46 41	−16 56	279.5	2.19	4, 4	..	26-inch	400	F.	Mags. about equal, 9.0; seeing poor.
1900.357				278.9	2.34	4, 8	g	12-inch	...	B.	Mags. equal.
.475				281.0	2.61	4, 8	..	" "	...	B.	
.573				278.0	2.01	4, 8	..	" "	...	B.	Mags. 9.6 – 9.8; very difficult; faint.
1895.549				279.5	2.19						
1900.468				279.3	2.32						
1899.399	β 810	15 47 36	+42 46	82.9	0.96	4, 4	2	26-inch	600	Br.	Mags. 8.5 – 11.0; very difficult.
.423				87.8	0.88	4, 4	3	" "	600	Br.	
1899.411				85.4	0.92						
1899.582	Σ 1985	15 50 44	− 1 52	336.5	6.02	8, 16	5	12-inch	...	See	✠ II. 85.
1900.584				338.3	5.49	4, 8	..	" "	...	B.	Mags. 6.0–5.5.
.590				335.3	6.02	4, 8	..	" "	...	B.	
1903.519				335.8	6.13	4, 6	3	26-inch	600	Sk.	Mags. 7.0–9.5.
1899.582				336.5	6.02						
1900.587				336.8	5.76						
1903.519				335.8	6.13						
1903.519	Σ 3101	15 53 41	− 2 47	61.3	2.53	4, 6	3	26-inch	600	Sk.	Mags. 9.0–9.0.
1903.514	β 623	15 55 55	− 6 41	232.8	1.01	4, 6	3–4	26-inch	600	Sk.	Mags. 9.5–9.5.
.517				233.2	0.97	4, 6	3	" "	600	Sk.	Mags. 9.3–9.3.
1903.516				233.0	0.99						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.515	*0Σ* 303	15 56 14	+13 33	143.3	0.92	4, 4	2	26-inch	600	Br.	Clouds.
1899.582				144.6	1.12	8, 16	2	12-inch	...	See	Blurred.
1902.534				142.5	0.98	5, 10	3–2	26-inch	400	D.	
.534				144.4	1.03	5, 10	3–4	" "	600	Fk.	
1897.515				143.3	0.92						
1899.582				144.6	1.12						
1902.534				143.4	1.00						
1898.592	Σ 1998=ξ Scorpii	15 58 52	−11 6	221.1	0.74	4, 4	2	26-inch	600	Br.	
.600	(A and B)			218.6	0.83	4, 4	3	" "	600	Br.	
1899.547				221.5	0.89	4, 8	5	12-inch	...	See	
.582				223.9	0.84	4, 8	3	" "	...	See	Clearly divided.
1898.596				219.8	0.78						
1899.564				222.7	0.86						
1899.547	(AB and C)			63.2	7.44	4, 8	5	12-inch	...	See	
.582				62.4	7.54	4, 8	3	" "	...	See	
1899.564				62.8	7.49						
1899.582	β 120=ν Scorpii	16 6 11	−19 12	3.4	0.76	8, 16	3	12-inch	...	See	
	(A and B)										
1899.582	(A and C)			336.8	41.58	8, 8	3	12-inch	...	See	
1899.582	(C and D)			50.4	2.13	8, 16	3	12-inch	...	See	
1899.582	Σ 2022	16 8 38	+26 56	135.0	2.65	8, 16	3	12-inch	...	See	
1900.584	Σ 2021=49 Serpentis	16 8 39	+13 48	337.2	3.94	4, 8	..	12-inch	...	B.	
.590				333.1	3.84	4, 8	..	" "	...	B.	
.658				333.8	3.41	4, 8	..	" "	...	B.	
1902.534				334.0	4.06	5, 10	3	26-inch	400	D.	
.534				335.2	4.09	5, 10	3–4	" "	400	Fk.	
.542				337.2	4.24	5, 10	2	" "	600	Fk.	
.542				333.0	4.06	5, 10	1–2	" "	600	D.	
1900.611				334.7	3.73						
1902.538				334.8	4.11						
1897.559	Σ 2027	16 10 19	+ 4 31	75.6	1.95	4, 4	2	26-inch	600	Br.	
1897.559	Σ 2032=σ Coronæ	16 10 56	+34 7	210.8	4.31	4, 4	2	26-inch	600	Br.	
1900.573	(A and B)			218.7	4.26	4, 8	..	12-inch	...	B.	Mags. 7.0–8.2.
.584				216.6	4.40	4, 8	..	" "	...	B.	Neither star brighter than mag. 9.5.
1897.559				210.8	4.31						
1900.578				217.6	4.33						
1897.600	Σ 2026	16 11 4	+ 7 37	260.4	0.40	4, 4	2	26-inch	888	Br.	
.619				252.6	0.53	4, 4	2	" "	888	Br.	Very faint; unsteady and diffuse.
.649				254.5	0.55	4, 4	2	" "	888	Br.	
1897.623				255.8	0.49						
1897.592	*0Σ* 309	16 15 55	+41 54	245.8	0.58	4, 4	2	26-inch	600	Br.	Faint.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.575	Σ 2041	16 16 43	+ 1 27	359.0	2.63	4, 4	2	26-inch	600	Br.	
1900.595	Σ 2044	16 20 36	+37 16	342.6	8.60	4, 8	..	12-inch	...	B.	
.612				344.0	8.93	4, 8	..	" "	...	B.	
1900.604				343.3	8.76						
1900.584	Σ 2054=99 Draconis	16 22 28	+61 55	356.5	1.32	4, 8	..	12-inch	...	B.	
.590				360.2	1.28	4, 8	..	" "	...	B.	
1900.587				358.4	1.30						
1899.544	α Scorpii	16 23 16	−26 13	276.1	3.51	4, 6	3	12-inch	...	See	Cloudy.
1900.595				265.5	3.16	4, 8	..	" "	...	B.	
.612				268.3	3.43	4, 8	..	" "	...	B.	
1902.525				273.3	3.22	5, 10	4	26-inch	600	Pk.	
.525				275.5	3.04	5, 10	4	" "	600	D.	
1899.544				276.1	3.51						
1900.604				266.9	3.30						
1902.525				274.4	3.13						
1903.563	Σ 2048	16 23 25	− 7 54	299.8	5.15	4, 6	3–4	26-inch	600	Sk.	Mags. 7.0–10.0.
1896.567	Σ 2049	16 23 48	+26 12	208.7	1.23	3, 4	2	26-inch	600	Br.	
1897.559	Σ 2052=71 Herculis	16 24 30	+18 37	95.3	1.83	4, 4	1	26-inch	600	Br.	
.575				92.4	2.01	4, 4	2	" "	600	Br.	
1900.595				95.9	2.07	4, 8	..	12-inch	...	B.	
.612				97.1	2.19	4, 8	..	" "	...	B.	
1897.567				93.8	1.92						
1900.604				96.5	2.13						
1907.517	Σ 3104	16 24 53	−14 20	47.8	9.52	4, 6	f–g	26-inch	400	R.	Mags. 8.8–9.2.
1896.567	Σ 2055=λ Ophiuchi	16 25 52	+ 2 12	49.9	1.47	3, 4	2	26-inch	600	Br.	
1899.544				55.5	1.78	4, 6	3	12-inch	...	See	Unsteady.
1900.595				47.3	1.60	4, 8	..	" "	...	B.	
.612				60.2	1.92	4, 8	..	" "	...	B.	Very difficult; indistinct.
.699				53.8	1.58	4, 8	..	" "	...	B.	
1896.567				49.9	1.47						
1899.544				55.5	1.78						
1900.635				53.8	1.70						
1897.592	0Σ 313	16 29 10	+40 20	150.0	0.91	4, 4	3	26-inch	600	Br.	
1897.655	0Σ 314	16 34 31	+20 40	236.9	3.59	4, 4	2	26-inch	400	Br.	Bad.
1899.859	Σ 2084=ζ Herculis	16 37 32	+31 47	258.3	0.33	3, 4	..	26-inch	...	See	Not separated.
.861				272.3	0.37	3, 4	..	" "	...	See	Unsteady; not separated.
1899.860				265.3	0.35						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.668	Σ 2091	16 38 53	+41 23	303.2	0.99	4, 4	2	26-inch	600	Br.	
.671				303.7	0.98	4, 4	2	" "	600	Br.	
1897.670				303.4	0.98						
1895.549	Skinner 10	16 40 28	−17 10	87.2	3.61	4, 4	..	26-inch	400	F.	Seeing poor.
.607				85.4	3.28	4, 4	..	" "	400	F.	Seeing poor;
1900.357				90.2	3.87	4, 8	g	12-inch	...	B.	clouds; mags.
.486				88.3	4.30	4, 8	..	" "	...	B.	about equal.
.573				89.1	3.52	4, 8	..	" "	...	B.	Mags. 9.5–9.5.
1895.578				86.3	3.44						
1900.472				89.2	3.90						
1899.396	Δ 15	16 40 50	+43 40	325.7	0.55	4, 4	3	26-inch	785	Br.	
.423				321.4	0.58	4, 6	2	" "	{888 / 600}	Br.	
1899.410				323.6	0.56						
1900.595	Σ 2097	16 41 11	+35 55	85.3	2.01	4, 8	..	12-inch	...	B.	
.612				84.2	2.17	4, 8	..	" "	...	B.	
1900.604				84.8	2.09						
1898.646	β 43	16 43 19	+ 2 55	242.9	1.16	4, 4	2	26-inch	600	Br.	
1899.396	Σ 2107=167 Herculis	16 47 53	+28 50	319.5	0.33	4, 4	3	26-inch	785	Br.	
1903.514	Σ 3106	16 50 20	− 5 0	245.4	2.50	4, 6	4	26-inch	600	Sk.	Mags. 9.0–9.0.
.517				248.2	2.18	4, 6	4	" "	600	Sk.	Mags. 9.0–9.0.
.519				245.3	2.43	4, 6	4	" "	600	Sk.	Mags. 9.0–9.0.
.560				247.7	2.32	4, 6	3	" "	600	Sk.	
1903.528				246.6	2.36						
1900.699	0Σ 318	16 52 5	+14 18	244.9	3.06	4, 8	..	12-inch	...	B.	Yellow, bluish.
1897.600	0Σ 319	16 53 32	+15 18	64.3	0.68	4, 4	2	26-inch	600	Br.	
1902.534	Σ 3107	16 53 52	+ 4 7	95.8	1.65	5, 10	3–4	26-inch	400	D.	
1897.614	0Σ 322	16 56 16	+37 4	202.8	1.61	4, 4	2	26-inch	600	Br.	
1903.560	Σ 2119	17 0 50	−13 48	14.1	2.32	4, 6	3	26-inch	600	Sk.	
.563				13.2	2.39	4, 6	3	" "	600	Sk.	Mags. 8.5–8.5.
.569				12.4	2.30	4, 6	4	" "	600	Sk.	Mags. 8.0–8.0.
.593				12.8	2.29	4, 6	..	" "	600	D.	Unsteady.
.604				11.5	2.23	4, 6	f	" "	600	D.	
.610				11.7	2.13	4, 6	p	" "	600	D.	
1903.583				12.6	2.28						
1900.658	Σ 2130=μ Draconis (A and B)	17 3 16	+54 36	144.0	3.25	4, 8	..	12-inch	...	B.	
.699				147.5	2.40	4, 8	..	" "	...	B.	
1900.678				145.8	2.82						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.690	*0Σ* 324	17 4 12	+31 20	220.6	3.89	4, 4	3	26-inch	400	Br.	
1899.437	*β* 1118=*η* Ophiuchi (A and B)	17 4 38	−15 36	257.7	0.42	4, 6	2	26-inch	888	See	Well separated.
1903.569	*β* 124	17 5 1	− 0 38	270.7	1.26	4, 6	4	26-inch	600	Sk.	Mags. 8.0–11.0.
.593				270.1	0.86	4, 6	..	" "	600	D.	Unsteady; very difficult.
.604				266.2	0.85	4, 6	f	" "	600	D.	Very difficult.
1903.589				269.0	0.99						
1903.560	Σ 2132	17 7 28	− 3 56	112.6	1.76	4, 6	3	26-inch	600	Sk.	
.569				111.8	1.57	4, 6	3–4	" "	600	Sk.	Mags. 8.0–8.5.
.604				111.2	1.78	4, 6	f	" "	600	D.	
1903.578				111.9	1.70						
1900.658	Σ 2135	17 7 49	+21 21	178.0	6.59	4, 8	..	12-inch	...	B.	
.699				176.7	7.07	4, 8	..	" "	...	B.	White, bluish.
1900.678				177.4	6.83						
1897.614	*0Σ* 325	17 8 10	+ 7 52	210.6	1.36	4, 4	2	26-inch	600	Br.	
1899.547	Σ 2140=*α* Herculis (A and B)	17 10 5	+14 30	116.0	4.69	4, 8	5	12-inch	...	See	
1900.617				115.7	4.58	4, 8	..	" "	...	B.	
.650				115.3	4.35	4, 8	..	" "	...	B.	
1899.547				116.0	4.69						
1900.634				115.5	4.46						
1897.690	*0Σ* 328=68 Herculis	17 13 38	+33 12	57.2	4.42	4, 4	3	26-inch	400	Br.	
1898.712	*β* 628	17 14 39	+32 46	353.9	0.46	4, 4	2	26-inch	888	Br.	
1898.635	*β* 959	17 17 8	+ 5 6	254.9	3.43	4, 4	3	26-inch	400	Br.	
.643				257.1	3.61	4, 4	2	" "	400	Br.	
1898.639				256.0	3.52						
1898.635	*β* 242 (A and B)	17 18 29	−11 36	72.8	0.83	4, 4	2	26-inch	600	Br.	
1903.571				70.4	0.95	4, 6	4	" "	600	Sk.	Mags. 8.5–9.5.
1898.635	(A and C)			62.5	9.62	4, 4	2	26-inch	600	Br.	
1898.635	(A and D)			63.6	47.93	4, 4	2	26-inch	600	Br.	
1898.629	*β* 46	17 19 2	+13 30	204.7	1.99	4, 4	2	26-inch	400	Br.	
.668				206.1	1.95	4, 4	2	" "	400	Br.	
1898.648				205.4	1.97						
1898.712	*β* 1249 (A and B)	17 19 56	+53 57	82.2	0.49	4, 4	2	26-inch	600	Br.	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1898.712	β 1249 (Continued)..... (A and C)	17 19 56	+53 57	74.6	62.67	4, 4	2	26-inch	600	Br.	
1899.547	Σ 2161=ρ Herculis	17 20 14	+37 14	311.8	4.08	4, 8	5	12-inch	...	See	
1900.658	Σ 2165=281 Herculis....	17 22 21	+29 32	[23.8]	8.10	4, 8	..	12-inch	...	B.	Position angle
.699				53.8	8.19	4, 8	..	" "	...	B.	probably 30° wrong.
1900.678				53.8	8.14						
1897.655	Σ 2171.....	17 23 46	− 9 55	66.4	1.56	4, 4	2	26-inch	400	Br.	
1903.593				67.6	1.80	4, 6	..	" "	600	D.	Unsteady.
.634				68.6	1.77	4, 6	p	" "	600	D.	
.640				67.0	1.72	4, 6	p	" "	...	D.	
1897.655				66.4	1.56						
1903.622				67.7	1.76						
1896.567	Σ 2173=221 Ophiuchi...	17 25 15	− 0 59	333.9	1.11	3, 4	2	26-inch	600	Br.	
.614				334.7	1.28	4, 4	2	" "	600	Br.	
.616				332.0	1.07	4, 4	3–2	" "	600	Br.	
1899.547				327.6	1.08	4, 8	5	12-inch	...	See	
1903.571				324.2	0.93	4, 6	3–4	26-inch	600	Sk.	Mags. 6.0–6.0.
.593				325.4	1.24	4, 6	b	" "	600	D.	Blue, yellow.
.596				325.8	1.25	4, 6	b	" "	600	D.	
.599				326.0	1.31	4, 6	b	" "	...	D.	
.629				325.7	1.20	4, 6	f	" "	...	D.	Mags. 6.0–6.3; unsteady.
1896.599				333.5	1.15						
1899.547				327.6	1.08						
1903.598				325.4	1.19						
1897.674	0Σ 331.....	17 27 2	+ 2 54	339.4	0.90	4, 4	3	26-inch	600	Br.	
.677				335.4	0.95	4, 4	3	" "	600	Br.	
1897.676				337.4	0.92						
1900.658	Σ 2190.....	17 31 43	+21 4	22.8	10.44	4, 8	..	12-inch	...	B.	Mags. 9.2–9.8.
.699				[27.7]	10.48	4, 8	..	" "	...	B.	Position angle probably wrong.
1900.678				22.8	10.46						
1898.629	β 960.....	17 33 5	− 1 6	293.8	3.57	4, 4	2	26-inch	400	Br.	
.646				294.7	3.51	4, 4	2	" "	400	Br.	
1898.638				294.2	3.54						
1900.699	Σ 2192=315 Herculis....	17 36 11	+29 18	61.7	11.00	4, 8	..	12-inch	...	B.	
1895.604	Hu 184.....	17 36 29	−15 40	273.1	4.20	4, 4	3	26-inch	400	F.	Discovered by Skinner previously to Hussey.
.607				275.3	3.99	4, 4	..	" "	400	F.	Seeing poor.
1900.573				286.4	4.23	4, 8	..	12-inch	...	B.	Mags. 9.2–9.7.
.650				276.3	4.07	4, 8	..	" "	...	B.	
.658				279.4	4.31	4, 8	..	" "	...	B.	
1895.606				274.2	4.10						
1900.627				280.7	4.20						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1898.676	β 1251	17 37 29	+16 0	69.2	1.40	4, 4	2	26-inch	600	Br.	
1900.696	Σ 2218	17 39 40	+63 43	338.7	2.01	4, 8	..	12-inch	...	B.	
.699				338.5	2.24	4, 8	..	" "	...	B.	
1900.698				338.6	2.12						
1900.573	Σ 2205	17 41 16	+17 45	309.4	1.78	4, 8	..	12-inch	...	B.	
.595				308.5	2.57	4, 8	..	" "	...	B.	
1900.584				309.0	2.18						
1897.619	A. Clark 7=μ Herculis (B and C)	17 42 33	+27 47	50.0	1.42	4, 4	2	26-inch	400	Br.	A and B=Σ 2220.
.649				52.6	1.51	4, 4	1–2	" "	600	Br.	
.655				52.7	1.50	4, 4	1–2	" "	400	Br.	
1906.422				74.0	1.54	4, 6	f	" "	400	Hd.	
.482				72.1	1.45	4, 6	g	" "	785	Hd.	
.482				74.2	1.40	3, 6	g	" "	785	Fn.	
.668				73.1	1.36	4, 6	f	" "	600	Hd.	Bright field.
.668				71.6	1.69	3, 6	p–f	" "	600	Fn.	
1897.641				51.8	1.48						
1906.544				73.0	1.49						
1898.670	β 824	17 43 42	− 1 50	351.3	0.63	4, 4	2	26-inch	888	Br.	
1903.629				351.4	0.72	4, 6	f	" "	...	D.	
1898.597	OΣ 338	17 47 28	+15 21	19.0	0.66	4, 8	3	26-inch	{600 888}	Br.	
1899.328	A. Clark 9	17 50 17	+29 50	148.8	1.38	4, 4	2	26-inch	888	Br.	Position angle not in agreement with other observers.
1897.616	Σ 2244	17 51 57	+ 0 5	275.6	1.12	4, 4	2–3	26-inch	600	Br.	
1898.643	β 417	17 52 54	+39 27	274.3	1.52	4, 4	3	26-inch	400	Br.	
.670				272.0	1.57	4, 4	2	" "	600	Br.	
1898.656				273.2	1.54						
1896.598	Σ 2262=τ Ophiuchi	17 57 38	− 8 11	255.8	1.99	3, 4	..	26-inch	400	Br.	♅ I. 88.
.601				256.1	1.96	3, 4	3	" "	600	Br.	
.616				258.6	1.93	4, 4	1–2	" "	600	Br.	
1899.547				255.4	2.24	4, 8	5	12-inch	...	See	
1900.617				259.1	2.06	4, 8	..	" "	...	B.	
.650				259.6	2.08	4, 8	..	" "	...	B.	
1903.593				260.0	1.97	4, 6	b	26-inch	600	D.	
.596				259.9	2.06	4, 6	b	" "	600	D.	
.599				259.3	2.09	4, 6	b	" "	...	D.	
.604				261.1	2.07	4, 6	f	" "	400	D.	
.610				260.4	2.01	4, 6	p	" "	600	D.	Unsteady.
1896.605				256.8	1.96						
1899.547				255.4	2.24						
1900.634				259.4	2.07						
1903.600				260.1	2.04						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1898.629	β 635 (A and B)	17 57 42	+ 1 37	116.6	1.45	5, 4	2	26-inch	600	Br.	
.668				116.8	1.53	4, 6	2	" "	600	Br.	
1898.648				116.7	1.49						
1898.629	(A and C)			122.0	69.27	4, 4	2	26-inch	600	Br.	
.668				122.1	69.16	4, 4	2	" "	600	Br.	
1898.648				122.0	69.22						
1900.699	Σ 2271	17 58 8	+52 51	267.9	2.42	4, 8	..	12-inch	...	B.	
1900.699	Σ 2267	17 58 27	+40 11	246.2	1.28	4, 8	..	12-inch	...	B.	
1897.649	Σ 2275	18 0 0	+39 21	135.8	0.75	4, 4	3	26-inch	600	Br.	
1896.598	Σ 2272=70 Ophiuchi	18 0 24	+ 2 31	293.1	2.33	3, 4	..	26-inch	400	Br.	
.601	(A and B)			290.3	2.29	3, 4	3	" "	600	Br.	
.671				281.2	2.07	4, 4	3	" "	600	Br.	
1898.720				271.3	2.00	4, 4	2	" "	600	Br.	
.722				271.8	1.86	4, 4	4	" "	600	Br.	
1899.412				263.2	1.77	8, 8	2	" "	600	Br.	Unsteady; blazing.
.421				262.4	1.80	4, 6	3	" "	600	Br.	
.426				261.4	1.79	4, 4	2	" "	600	Br.	
.429				260.2	1.98	4, 6	3	" "	600	See	
.434				261.4	1.97	4, 6	..	" "	...	See	
.544				261.4	2.08	4, 8	3	12-inch	...	See	
.547				260.3	1.79	4, 8	5	" "	...	See	
.703				263.6	2.07	4, 8	..	26-inch	...	See	Star blazing; poor.
1900.535				248.1	1.91	5, 8	4–5	" "	600	See	
.538				250.5	1.81	5, 8	4	" "	600	See	
.540				245.6	1.91	9, 10	3–4	" "	600	See	
.595				247.6	1.72	5, 8	2	" "	888	See	
.595				247.8	1.85	4, 8	..	12-inch	...	B.	
.612				256.4	1.88	4, 8	..	" "	...	B.	
.617				244.0	1.92	4, 8	..	" "	...	B.	
.628				242.2	1.90	4, 8	4	26-inch	600	See	
.650				247.9	1.67	4, 8	..	12-inch	...	B.	Better than former measures.
.658				244.7	1.69	4, 8	..	12-inch	...	B.	Twilight; no illumination.
1901.490				232.7	1.88	8, 15	3	26-inch	600	See	
.586				231.2	1.90	4, 8	3	" "	400	See	Blurred and unsteady.
1902.632				2	1.89	5, 10	3	" "	400	See	
1896.623					23						
1898.721					3						
1899.490											
1900.597											
1901.538				2							
1902.632				21							
1899.429	(B and			207		4, 8	3	26-inch	600	See	
.434				209		4, 8	..	" "	...	See	
1900.535				209		4, 8	4–5	" "	600	See	Measures with great care.
.538				210.		4, 8	4	" "	600	See	
.540				209.		, 10	3–4	" "	600	See	
.628				09.		8	4	" "	600	See	
32				08.							
				9.							

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1899.426	Σ 2272—(Continued)..... (A and C)	18 0 24	+ 2 31	209.7	51.97	4, 4	2	26-inch	600	Br.	
1900.628	(B and E).....			167.8	68.40	4, 8	3	26-inch	600	See	
1900.628	(B and D).....			247.4	69.28	4, 8	3	26-inch	600	See	
1898.676	β 636 (A and B)	18 3 5	+ 2 12	126.0	4.65	4, 4	2	26-inch	600	Br.	
1897.616	Σ 2283.....	18 4 41	+ 6 8	86.0	1.07	4, 4	1–2	26-inch	600	Br.	
.619				78.9	0.92	6, 4	2	" "	600	Br.	
.633				82.7	1.03	4, 4	2	" "	600	Br.	
1897.623				82.5	1.01						
1903.604	β 132.....	18 5 19	−19 52	220.3	0.99	4, 6	f	26-inch	600	D.	Very difficult; blue, yellow.
.629				223.4	1.18	4, 6	f	" "	...	D.	
.634				222.2	0.96	4, 6	b	" "	600	D.	Mags.equal; blue, red.
.637				221.2	1.25	4, 6	b	" "	...	D.	
1903.626				221.8	1.10						
1898.670	β 638 (B and C).....	18 5 20	+ 2 34	6.5	1.75	4, 4	2	26-inch	600	Br.	
1898.670	(A and B).....			151.8	22.41	4, 4	2	26-inch	600	Br.	
1903.640	Hu 317.....	18 6 54	+17 12	20.3	1.98	4, 6	p	26-inch	...	D.	
1903.593	β 131 (A and B).....	18 7 51	−15 37	279.0	2.83	4, 6	b	26-inch	600	D.	Mags. 7.7–9.2; yellow, red
.604				279.1	2.75	4, 6	g	" "	600	D.	
.610				279.1	2.92	4, 6	p	" "	600	D.	Unsteady.
.629				279.0	2.86	4, 6	g	" "	...	D.	
1903.609				279.0	2.84						
1903.593	(A and C).....			283.2	7.13	4, 6	b	26-inch	600	D.	Mag. of C 10.4.
.604				284.7	7.66	4, 7	g	" "	600	D.	
.629				283.2	7.52	4, 6	g	" "	...	D.	Mag. of C 10.2.
1903.609				283.7	7.44						
1897.619	0Σ 345.....	18 7 55	+ 5 48	62.9	1.18	4, 4	2	26-inch	600	Br.	Unsteady and diffuse.
1903.593	Hn 142.....	18 9 5	−11 16	248.6	1.10	4, 6	b	26-inch	600	D.	
.604				247.8	0.88	4, 6	g	" "	600	D.	
.629				248.4	0.85	4, 6	f	" "	...	D.	
.634				249.8	1.05	4, 6	b	" "	600	D.	Clouds.
1903.615				248.6	0.97						
1903.604	Σ 2296.....	18 10 27	− 3 23	8.1	3.14	4, 6	g	26-inch	600	D.	
.610				8.0	3.08	4, 6	b	" "	600	D.	
.629				7.4	3.45	4, 6	f	" "	...	D.	
.634				7.7	3.25	4, 6	b	" "	600	D.	
1903.619				7.8	3.23						

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.634	β 463	18 11 53	−16 54	101.4	1.86	4, 6	b	26-inch	600	D.	
.637				101.6	2.07	4, 6	b	" "	...	D.	Mags. 9.9–10.3.
1903.636				101.5	1.96						
1903.634	Schj. 16	18 14 28	− 5 0	196.5	3.03	4, 6	b	26-inch	600	D.	
.637				198.2	2.70	4, 6	p	" "	...	D.	
.640				197.5	2.72	4, 6	p	" "	...	D.	
.642				197.4	2.47	4, 6	f	" "	...	D.	
1903.638				197.4	2.73						
1897.674	Σ 2303	18 14 39	− 8 1	226.9	2.46	4, 4	2	26-inch	600	Br.	
1900.650				229.2	2.45	4, 8	..	12-inch	...	B.	
.658				233.5	2.38	4, 8	..	" "	...	B.	
1903.637				225.8	2.63	4, 6	p	26-inch	...	D.	
.642				225.4	2.60	4, 6	f	" "	...	D.	
.645				222.5	2.64	4, 6	f	" "	...	D.	
1897.674				226.9	2.46						
1900.654				231.4	2.42						
1903.641				224.6	2.62						
1903.637	β 48	18 15 6	−19 42	359.9	2.56	4, 6	p	26-inch	...	D.	Mags. 8.6–9.5.
.642				358.4	2.34	4, 6	p	" "	...	D.	Mags. 8.2–9.2;
.645				360.6	2.26	4, 6	b	" "	...	D.	yellow, red.
1903.641				359.6	2.39						
1897.655	Σ 2312	18 17 14	+28 17	338.9	1.43	4, 4	2	26-inch	400	Br.	Images unsteady and diffuse.
1903.593	Σ 2313	18 19 21	− 6 39	196.8	6.22	4, 7	b	26-inch	600	D.	
.637				197.3	6.11	4, 6	p	" "	...	D.	
.642				197.2	6.11	4, 6	p	" "	...	D.	
.645				197.5	6.12	4, 6	f	" "	...	D.	
1903.629				197.2	6.14						
1897.693	0Σ 350	18 22 0	+ 6 22	167.2	1.81	4, 4	2	26-inch	600	Br.	
1900.573	Σ 2316=59 Serpentis	18 22 6	+ 0 8	312.9	4.26	4, 8	..	12-inch	...	B.	Mags. 6.0–8.0.
.658				321.5	3.71	4, 8	..	" "	...	B.	
.683				317.6	3.87	4, 8	..	" "	...	B.	
1900.638				317.3	3.95						
1903.645	β 419	18 26 47	− 7 54	49.2	1.17	4, 6	b	26-inch	...	D.	Yellow, orange.
1901.523	Σ 2345	18 31 14	+21 0	205.2	8.96	4, 8	2–3	26-inch	400	La.	
1897.693	0Σ 359	18 31 21	+23 32	341.6	0.39	4, 4	3	26-inch	888	Br.	
1903.637	Σ 2347=196 Serpentis	18 32 48	− 0 28	257.8	3.20	4, 6	p	26-inch	...	D.	
.642				258.2	3.38	4, 6	p	" "	...	D.	Yellow, red.
1903.640				258.0	3.29						

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DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1897.633	*0Σ* 360	18 33 44	+ 4 46	293.5	1.67	4, 4	2	26-inch	600	Br.	Sky thick; unsteady and diffuse.
1903.604	Σ 2373	18 40 19	−10 36	336.5	4.05	4, 6	g	26-inch	600	D.	
.629				335.7	4.08	4, 6	f	" "	...	D.	
.642				336.3	4.22	4, 6	p	" "	...	D.	Yellow, orange.
1903.625				336.2	4.12						
1901.523	Σ 2375	18 40 34	+ 5 24	116.4	2.72	4, 8	2–3	26-inch	400	La.	
1903.642	Σ 2379=5 Aquilæ (A and B)	18 41 19	− 1 4	120.4	13.12	4, 6	b	26-inch	...	D.	ℍ III. 33.
1903.604	β 970	18 45 20	− 8 6	107.8	1.04	4, 6	g	26-inch	600	D.	Very difficult.
1897.693	Σ 2409	18 47 8	+13 24	29.1	0.97	4, 2	2	26-inch	600	Br.	
1897.690	β 648	18 53 16	+32 46	234.8	1.50	4, 4	3	26-inch	600	Br.	Seeing very poor.
.786				236.2	1.32	4, 4	2	" "	600	Br.	
1898.712				233.8	1.31	4, 4	3	" "	600	Br.	
1897.738				235.5	1.41						
1898.712				233.8	1.31						
1898.714	Σ 2434 (B and C)	18 57 36	− 0 51	53.9	1.56	4, 4	2	26-inch	600	Br.	
1903.604				55.9	1.12	4, 7	g	" "	600	D.	
1903.634	S 710	19 1 7	−16 23	0.5	5.84	4, 6	b	26-inch	600	D.	Observation worthless.
1898.643	Σ 2464	19 4 32	+11 42	24.1	1.30	4, 4	2	26-inch	600	Br.	
1897.789	*0Σ* 369	19 8 32	+71 55	35.9	0.84	4, 4	3	26-inch	600	Br.	
1898.722	Σ 2525=22 Cygni	19 22 30	+27 7	320.2	0.44	4, 4	3	26-inch	888	Br.	
1899.815				323.0	0.53	4, 4	3	" "	888	See	
815				320.0	0.40	5, 4	3	" "	888	Br.	
1898.722				320.2	0.44						
1899.815				321.5	0.46						
1901.521	*0Σ* 376	19 31 23	+33 59	233.2	2.90	4, 8	..	26-inch	...	La.	
1897.789	*0Σ* 384	19 40 14	+38 5	189.2	0.99	4, 4	2	26-inch	600	Br.	Very unsteady and blazing.
1901.521	Σ 2576	19 41 46	+33 22	295.1	2.90	4, 8	..	26-inch	...	La.	
523				294.5	2.86	4, 8	2–3	" "	400	La.	
1901.522				294.8	2.88						
1901.524	Σ 2583=ε Aquilæ	19 44 0	+11 34	115.1	1.27	4, 8	2–3	26-inch	400	La.	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.642	♅ I. 93	19 56 31	− 0 28	293.7	2.29	4, 6	b	26-inch	...	D.	White, yellow.
1897.792	β 1205	20 6 51	− 8 23	48.2	0.59	4, 4	2	26-inch	600	Br.	
1899.755	*OΣ* 400	20 6 54	+43 39	23.5	0.33	4, 8	3–4	26-inch	...	See	Elongated; quite reddish.
.815				26.8	0.20	4, 4	3	" "	888	See	Barely divided.
.815				23.2	0.22	3, 4	3	" "	888	Br.	
1899.795				24.5	0.25						
1899.755	*OΣ* 403 (A and B)	20 10 55	+41 48	170.9	0.95	4, 8	4	26-inch	...	See	Well divided.
1899.755	(A and C)			35.3	11.51	4, 8	4	26-inch	...	See	
1897.792	β 1206	20 15 22	+36 26	1.6	2.15	4, 4	2	26-inch	600	Br.	
1903.590	Schj. 25	20 15 25	− 8 3	216.9	3.00	4, 6	..	26-inch	600	D.	Fog; yellow, blue.
1897.792	β 432	20 20 59	+35 26	196.7	1.35	4, 4	2	26-inch	600	Br.	
1897.800	β 63=1 Delphini	20 25 31	+10 34	345.2	1.23	4, 4	3	26-inch	600	Br.	
.844	(A and B)			347.9	0.99	4, 4	2	" "	600	Br.	
1897.822				346.6	1.11						
1897.844	β 670	20 28 13	+13 36	47.2	0.46	4, 4	2	26-inch	888	Br.	
1897.800	β 1208	20 29 37	+ 6 32	333.0	3.12	4, 4	3	26-inch	600	Br.	
1897.901	β 151=β Delphini	20 32 51	+14 15	359.5	0.63	4, 4	4	26-inch	888	Br.	
1898.722	(A and B)			2.9	0.60	4, 4	2	" "	888	Br.	
.725				3.0	0.50	4, 4	2	" "	888	Br.	
1899.547				2.3	0.64	4, 6	5	12-inch	...	See	Pear-shaped.
.752				2.8	0.56	4, 8	4	" "	...	See	Clearly elongated.
.755				8.4	0.72	4, 8	3–4	26-inch	...	See	
.755				8.3	0.65	4, 4	3–4	" "	...	Br.	
.760				4.0	0.54	7, 6	4	" "	888	Br.	
.760				7.2	0.65	7, 8	4	" "	888	See	
1901.490				12.7	0.63	4, 8	3	" "	600	See	
1897.901				359.5	0.63						
1898.724				3.0	0.55						
1899.722				5.5	0.63						
1901.490				12.7	0.63						
1897.789	*OΣ* 410 (A and B)	20 35 54	+40 14	15.6	0.70	4, 4	3	26-inch	600	Br.	
1897.901	β 152=55 Cephei	20 39 48	+57 2	106.8	0.50	4, 4	3	26-inch	888	Br.	
1897.833	β 64 (A and B)	20 40 15	+12 22	186.9	0.55	4, 4	3	26-inch	600	Br.	

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1895.604	Skinner 11	20 40 53	−17 4	298.9	4.09	4, 4	3	26-inch	400	F.	
.755				295.3	3.74	4, 4	..	" "	400	F.	
.757				298.0	3.54	4, 4	2	" "	400	F.	
1900.718				300.5	3.80	4, 8	..	12-inch	...	B.	
.820				299.5	3.50	8, 16	g	" "	...	B.	
1904.806				296.6	3.70	4, 6	3	26-inch	600	Sk.	Mags. 9.0–9.0.
.809				297.8	3.85	4, 6	2	" "	400	Sk.	Mags. 9.0–9.0.
.814				298.6	3.74	4, 6	3	" "	400	Sk.	Mags. 9.0–9.0.
1895.705				297.4	3.79						
1900.769				300.0	3.65						
1904.810				297.7	3.76						
1897.844	β 65=13 Delphini	20 42 51	+ 5 38	188.5	1.56	4, 4	3	26-inch	600	Br.	
.846				188.3	1.41	4, 4	3	" "	600	Br.	
1897.845				188.4	1.48						
1899.755	0Σ 413=λ Cygni (A and B)	20 43 31	+36 7	62.0	1.00	4, 8	3–4	26-inch	...	See	Well divided at times.
1897.792	β 67	20 46 27	+30 32	288.1	1.62	4, 4	3	26-inch	600	Br.	
1904.809	β 154	20 47 13	−16 32	57.1	2.98	4, 6	2	26-inch	400	Sk.	Mags. 8.5–9.0.
.814				62.1	3.26	4, 6	3–4	" "	400	Sk.	Mags. 9.0–9.5.
1904.812				59.6	3.12						
1897.901	β 155 (A and B)	20 48 0	+51 2	28.4	0.76	4, 4	4	26-inch	888	Br.	
1897.786	0Σ 417 (A and B)	20 48 51	+28 46	29.5	0.72	4, 4	3	26-inch	600	Br.	
1897.833	β 367 (A and B)	20 50 46	+27 43	137.1	0.42	4, 4	3	26-inch	888	Br.	
1897.786	0Σ 419	20 50 48	+36 42	34.5	1.61	4, 4	3	26-inch	400	Br.	
1897.846	β 678	20 55 25	− 8 44	201.4	2.48	4, 4	3	26-inch	600	Br.	
1902.755	Σ 2745=12 Aquarii	20 58 47	− 6 13	191.3	2.76	5, 10	1	26-inch	...	D.	
.755				193.0	2.60	5, 10	..	" "	...	Fk.	
1902.755				192.2	2.68						
1897.846	β 681	21 8 36	+16 30	240.6	3.10	4, 4	3	26-inch	600	Br.	
1899.760	A. G. Clark 13=τ Cygni (A and B)	21 10 48	+37 37	312.0	0.90	4, 8	4	26-inch	888	See	Clearly separated; yellow, bluish.
.760				312.4	0.84	4, 8	4	" "	888	Br.	Yellow, blue.
.774				307.8	0.82	8, 4	3–4	" "	888	Br.	
.774				313.4	0.87	4, 8	3–4	" "	888	See	
.812				314.4	0.82	4, 8	3	" "	888	See	
.812				315.8	0.86	4, 6	3	" "	888	Br.	
1899.782				312.6	0.85						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1899.812	Σ 2783	21 11 21	+57 53	28.8	1.26	4, 4	3	26-inch	888	See	
.812				30.2	1.03	5, 4	2	" "	888	Br.	Faint.
1899.812				29.5	1.14						
1897.852	β 838	21 15 52	+ 2 42	100.9	1.65	4, 4	2	26-inch	600	Br.	Mags. 8.0–11.0.
1904.836	β 1262	21 16 45	−15 20	115.5	2.19	4, 6	3	26-inch	600	Sk.	Mags. 9.0–10.0.
1901.852	Σ 2797	21 21 54	+13 15	214.5	3.67	5, 10	3–4	26-inch	400	See	
1901.852	Σ 2799=20 Pegasi	21 24 1	+10 39	297.2	1.90	5, 10	3	26-inch	400	See	Blurred.
1901.521	Σ 2802	21 27 35	+33 22	9.5	4.02	4, 8	..	26-inch	...	La.	
.852				9.2	3.93	5, 10	3	" "	400	See	
1901.686				9.4	3.98						
1901.521	Σ 2804	21 28 21	+20 16	331.9	3.53	4, 8	..	26-inch	...	La.	
.852				330.9	3.07	5, 10	3	" "	400	See	
1901.686				331.4	3.30						
1897.890	β 1212=24 Aquarii	21 34 22	− 0 30	267.4	0.73	4, 4	3	26-inch	600	Br.	
1899.976	(A and B)			282.6	....	5, ..	1–2	" "	600	Br.	Estimated distance 0″.5.
1897.890	(A and C)			143.4	43.10	4, 4	3	26-inch	600	Br.	
1901.523	Σ 2822=μ Cygni	21 39 40	+28 18	122.2	2.83	5, 8	2–3	26-inch	400	La.	
.852	(A and B)			123.7	2.76	5, 10	3	" "	400	See	
1901.688				123.0	2.80						
1901.852	(A and C)			271.1	41.57	5, 10	2	26-inch	400	See	
1899.812	β 989=κ Pegasi	21 40 7	+25 11	276.9	0.23	4, 8	3	26-inch	888	See	Just separated.
.812	(A and B)			279.4	0.25	4, 4	3	" "	888	Br.	Elongated; not separated.
.815				285.9	0.17	4, 4	3	" "	888	See	
.815				285.0	0.24	4, 4	3	" "	888	Br.	
1899.814				281.8	0.22						
1901.852	(AB and C)			296.5	12.41	5, 6	2	26-inch	400	See	Clouds.
.857				297.3	12.56	5, 10	3–4	" "	400	See	AC=Σ 2824.
1901.854				296.9	12.48						
1901.857	Σ 2825	21 41 47	+ 0 23	111.9	1.21	5, 10	2	26-inch	400	See	Blurred; not separated.
1903.626	Hu 281	21 43 53	+ 4 55	325.4	1.76	4, 6	e	26-inch	600	D.	Mags 9 0-9.6.
1903.626	Hu 89	21 46 7	−12 7	6.6	0.58	4, 6	e	26-inch	600	D.	Mags. 9.1–9.3.
1903.626	Hu 379	21 48 1	+ 4 50	254.1	1.60	4, 6	e	26-inch	600	D.	Mags. 9.0–10.5.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1903.626	β 693	21 50 57	− 7 27	50.7	1.14	4, 6	g	26-inch	600	D.	Mags. 7.5–9.8.
1903.626	Σ 2847	21 52 56	− 3 58	302.0	1.29	4, 6	g	26-inch	600	D.	
.642				300.7	1.37	4, 6	f	" "	...	D.	Mags. 8.5–8.7; both yellow; thick.
1903.634				301.4	1.33						
1903.642	H 3074	21 53 9	− 2 18	291.9	2.15	4, 6	p	26-inch	...	D.	Thick.
1902.755	S 802=29 Aquarii	21 56 58	−17 27	244.8	3.97	5, 10	1–2	26-inch	...	D.	Orange, green.
.755				245.1	3.90	5, 10	..	" "	...	Fk.	Clouds interrupt.
1904.809				240.5	4.44	4, 6	2	" "	400	Sk.	
.814				242.8	3.95	4, 6	3–4	" "	400	Sk.	
.864				240.6	4.23	4, 6	2–3	" "	400	Sk.	Mags. 7.0–8.0; yellow, blue.
1902.755				245.0	3.94						
1904.829				241.3	4.21						
1901.838	OΣ 463	22 5 28	+13 16	354.2	4.59	5, 10	3	26-inch	600	See	
1902.753	Sh 339=41 Aquarii	22 8 47	−21 34	115.1	4.96	5, 10	2	26-inch	...	Fk.	
.753				114.6	5.18	5, 10	2	" "	...	D.	
1903.642				113.5	5.12	4, 6	p	" "	...	D.	Orange, blue.
1904.853				117.4	4.89	4, 6	3	" "	400	Sk.	Mags. 5.0–7.0; orange, blue.
.858				116.7	4.80	4, 6	4	" "	400	Sk.	Mags. 6.0–7.0; orange, blue.
.864				116.9	5.22	4, 6	2–3	" "	400	Sk.	Mags. 6.0–8.0; yellow, blue.
1902.753				114.8	5.07						
1903.642				113.5	5.12						
1904.858				117.0	4.97						
1901.838	Σ 2877	22 9 30	+16 42	1.7	12.01	5, 10	2–3	26-inch	600	See	
1897.942	β 843	22 19 43	+ 2 9	234.4	3.57	4, 4	2	26-inch	600	Br.	Very faint.
1902.753	Sh 345=53 Aquarii (A and B)	22 21 8	−17 15	309.0	6.64	5, 10	b	26-inch	...	Fk.	Both yellow.
.753				306.5	6.79	5, 10	b	" "	...	D.	Both yellow.
1903.642				307.1	6.91	4, 6	p	" "	...	D.	Both yellow; unsteady.
1904.853				310.4	6.74	4, 6	3	" "	400	Sk.	Mags. 6.0–6.0.
.858				309.0	6.42	4, 6	4	" "	400	Sk.	Mags. 6.0–6.0.
.872				309.6	6.96	4, 6	2	" "	400	Sk.	Mags. 6.0–6.0.
1902.753				307.8	6.72						
1903.642				307.1	6.91						
1904.861				309.7	6.71						
1897.890	β 701	22 23 10	+11 44	267.9	1.41	4, 4	2	26-inch	600	Br.	
1901.849	Σ 2910	22 23 28	+23 1	341.8	5.49	5, 10	3	26-inch	400	See	
1901.849	Σ 2909=ζ Aquarii	22 23 41	− 0 32	319.5	3.28	5, 10	4–2	26-inch	400	See	
1902.753				320.3	3.30	5, 10	p	" "	...	Fk.	Both yellow.
.753				319.2	3.30	5, 10	p	" "	...	D.	
1903.642				317.8	3.27	4, 6	p	" "	...	D.	Both yellow; unsteady.

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1904.806	Σ 2909=ζ Aquarii—(Cont.)	22 23 42	− 0 32	315.4	3.35	4, 6	3	26-inch	600	Sk.	
.814				317.9	3.36	4, 6	3	" "	400	Sk.	
.853				317.8	3.11	4, 6	3	" "	400	Sk.	Mags. 4.0–4.0.
1901.849				319.5	3.28						
1902.753				319.8	3.30						
1903.642				317.8	3.27						
1904.824				317.0	3.27						
1899.760	Σ 2912=37 Pegasi	22 24 55	+ 3 56	286.3	0.42	4, 4	4	26-inch	888	See	Clearly separated.
.760				285.2	0.31	2, 2	4	" "	888	Br.	Thick; stars faint.
.774				297.1	0.32	4, 4	4	" "	888	See	
.774				297.8	0.28	4, 4	4	" "	888	Br.	Mags. 6.0–8.0.
.812				297.7	0.45	4, 4	2	" "	888	See	
.812				295.4	0.38	4, 4	2	" "	888	Br.	
1901.849				294.7	0.52	5, 10	3	" "	400	See	
1899.782				293.2	0.36						
1901.849				294.7	0.52						
1901.849	Σ 2915	22 27 33	+ 6 54	149.8	12.67	5, 10	3	26-inch	400	See	Apparently equal.
1904.880	Σ 2935	22 37 49	− 8 50	309.6	2.45	4, 6	2	26-inch	400	Sk.	⊞ I. 50; mags. 7.0–9.0.
1895.755	Hu 289	22 38 11	−16 40	107.6	1.97	4, 4	..	26-inch	400	F.	Discovered previously by Skinner.
1900.820				107.5	1.64	8, 16	..	12-inch	...	B.	Mags. 9.2–9.2.
.822				109.8	1.67	4, 8	..	" "	...	B.	
1895.755				107.6	1.97						
1900.821				108.6	1.66						
1897.833	β 711	22 40 29	+10 40	46.7	0.96	4, 4	3	26-inch	600	Br.	
1904.853	Σ 2944 (A and B)	22 42 41	− 4 45	258.6	3.72	4, 6	3	26-inch	400	Sk.	⊞ II. 57; mags. 7.0–7.0.
.858				258.7	3.31	4, 6	4	" "	400	Sk.	Mags. 7.5–8.0.
.872				256.3	3.84	4, 6	2–3	" "	400	Sk.	Mags. 7.0–8.0.
1904.861				257.9	3.62						
1904.880	β 177	22 47 0	−22 14	279.6	2.87	4, 6	2–3	26-inch	400	Sk.	Mags. 9.0–9.0.
1903.626	β 1010	22 50 20	− 6 7	134.3	1.28	4, 6	e	26-inch	600	D.	Mags. 9.0–9.4.
1904.885				134.9	1.28	4, 6	4	" "	600	Sk.	Mags. 9.5–10.0.
1901.893	Σ 2959 (A and B)	22 51 57	− 3 47	104.2	13.23	5, 10	2–3	26-inch	400	See	
1901.893	0Σ 536	22 53 30	+ 8 50	341.8	0.26	5, 10	3	26-inch	400	See	Elongated, not separated.
1901.893	0Σ 483=52 Pegasi	22 54 12	+11 12	227.5	1.46	5, 20	2–3	26-inch	400	See	
1904.885	β 384=265 Aquarii	22 57 18	−19 5	76.8	1.13	4, 6	4	26-inch	600	Sk.	Mags. 7.0–9.0.
1903.626	Hu 398	22 57 27	+18 4	321.2	0.53	4, 6	e	26-inch	600	D.	Mags. 8.7–9.0; separated.

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DOUBLE STARS—Continued.

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		h m s	° ′	°	″						
1903.642	Σ 2988=284 Aquarii.....	23 6 46	−12 29	278.3	3.73	4,6	p	26-inch	...	D.	Unsteady and thick.
1904.836				279.7	3.76	4,6	3	" "	400	Sk.	Mags. 7.0–7.0.
.839				281.1	3.54	4,6	4	" "	400	Sk.	Mags. 7.0–7.0.
.842				281.5	3.52	4,6	5	" "	400	Sk.	Mags. 7.0–7.0.
1903.642				278.3	3.73						
1904.839				280.8	3.61						
1897.885	β 79 (A and B).....	23 12 26	− 2 4	85.3	1.07	4,4	2	26-inch	600	Br.	Clouds; faint.
1899.949				88.0	0.99	4,4	2–3	" "	600	See	Blurred.
1903.626				80.3	0.80	4,6	g	" "	600	D.	Mags 8.6–9.2.
1899.949	β 80.....	23 13 45	+ 4 52	341.7	0.65	4,4	2–3	26-inch	600	See	
1904.872	H 3184.....	23 15 40	−19 5	282.1	5.54	4,6	2	26-inch	400	Sk.	Mags. 7.0–9.0; yellow, blue.
.891				284.3	5.51	4,6	2	" "	600	Sk.	Mags. 7.0–9.0.
.896				285.5	5.67	4,6	3–4	" "	400	Sk.	Mags. 7.0–9.0; yellow, blue.
1904.886				284.0	5.57						
1903.642	Σ 3008.....	23 18 34	− 9 0	245.9	3.83	4,6	p	26-inch	...	D.	Unsteady; yellow, blue.
.933				236.0	4.05	4,6	2–3	" "	600	Sk.	⊞ N. 112=S. 829; mags. 7.0–7.0.
.955				238.4	3.79	4,6	3	" "	600	Sk.	Mags. 7.0–8.0; white, blue.
.960				233.9	4.01	4,6	2	" "	600	Sk.	
1903.872				238.6	3.92						
1897.833	β 719.....	23 19 22	+13 56	358.8	1.47	4,4	3	26-inch	600	Br.	
1899.815	β 720=72 Pegasi.....	23 28 59	+30 46	167.8	0.35	4,4	3	26-inch	888	See	Well divided.
.949				157.7	0.62	4,4	2–3	" "	600	See	Well divided.
1899.882				162.8	0.48						
1897.942	β 81.....	23 30 3	−12 8	10.6	2.02	4,4	3	26-inch	400	Br.	
1899.949				5.8	2.09	4,4	2–3	" "	600	See	Blurred.
1899.815	β 721.....	23 31 8	− 7 40	127.0	0.30	4,4	3	26-inch	888	See	
.949				133.9	0.38	5,4	2–3	" "	600	See	
.949				142.9	....	4,..	2–3	" "	600	Br.	
1899.904				134.6	0.34						
1903.642	Σ 3030.....	23 35 35	− 0 56	221.6	2.68	4,6	p	26-inch	...	D.	Unsteady and thick; both yellow.
1904.872				220.9	2.56	4,6	2–3	" "	400	Sk.	Mags. 9.0–9.0.
.885				222.2	2.43	4,6	4	" "	600	Sk.	Mags. 8.9–9.1.
.891				218.7	2.38	4,6	3	" "	600	Sk.	Mags. 9.0–9.2.
.896				220.9	2.68	4,6	4	" "	600	Sk.	Mags. 8.9–9.1.
1903.642				221.6	2.68						
1904.886				220.7	2.51						

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DOUBLE STARS—Continued.

DATE.	NAME.	RIGHT ASCENSION 1900.0	DECLINATION 1900.0	POSITION ANGLE.	DISTANCE.	NUMBER OF MEASURES.	SEEING.	INSTRUMENT.	POWER.	OBS'R.	REMARKS.
		h m s	° ′	°	″						
1899.949	β 1223	23 40 12	+ 4 34	293.9	1.44	4, 4	2	26-inch	600	See	
1903.626	Hu 300	23 40 24	+ 5 56	122.1	1.15	4, 6	e	26-inch	600	D.	Mags. 8.9–9.0.
1904.839	Sh 356=107 Aquarii	23 40 49	−19 14	138.2	5.78	4, 6	3	26-inch	400	Sk.	ℍ II. 24; mags. 5.0–7.0; sky very thick.
.842				137.7	6.15	4, 6	4	" "	400	Sk.	Mags. 6.0–7.0.
.858				140.2	5.97	4, 6	4	" "	400	Sk.	Mags. 6.0–7.0.
1904.846				138.7	5.97						
1904.891	Σ 3036	23 40 53	− 0 18	223.2	2.82	4, 6	2–3	26-inch	600	Sk.	Mags. 8.0–11.0; straw, blue.
1899.815	β 726	23 41 25	−13 19	318.0	0.75	4, 4	3	26-inch	600	See	
1903.955	Σ 3046	23 51 15	−10 .3	249.8	3.19	4, 6	2	26-inch	600	Sk.	Mags. 8.0–8.0.
.960				247.4	3.18	4, 6	2	" "	600	Sk.	Very unsteady.
1904.891				248.9	3.16	4, 6	3	" "	600	Sk.	Mags. 8.8–9.0.
1903.958				248.6	3.18						
1904.891				248.9	3.16						
1902.917	Σ 3050=37 Andromedæ	23 54 23	+33 10	214.5	2.68	5, 10	2	26-inch	600	Sk.	
.917				214.5	2.66	5, 10	3	" "	600	Fk.	
1902.917				214.5	2.67						
1903.626	β 731	23 54 29	− 8 22	266.3	1.70	4, 6	e	26-inch	600	D.	Mags. 8.3–9.4.
1904.891				265.0	1.53	4, 6	2–3	" "	600	Sk.	Mags. 8.5–9.5.
.896				267.8	1.75	4, 6	3	" "	600	Sk.	Mags. 8.5–9.5; thin clouds, but steady.
1903.626				266.3	1.70						
1904.894				266.4	1.64						
1899.785	β 733=85 Pegasi (A and B)	23 56 55	+26 34	235.8	0.82	4, 4	3	26-inch	888	See	Reddish, blue.
.815				227.2	0.81	4, 4	3	" "	600	See	
.815				233.4	0.86	4, 4	3	" "	600	Br.	
1899.805				232.1	0.83						

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OBSERVATIONS OF MINOR PLANETS.

A 171

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(1) CERES.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 21	12 34 39	+0 54.89	+0 26.5	23 28 58.46	−20 13 15.5	9.062$_n$	0.873	1	25, 5	R.	12-inch
26	13 43 53	+0 28.03	+2 3.0	23 25 18.49	−20 47 8.5	8.906	0.877	2	21, 7	R.	" "
26	14 11 26	+1 46.58	−7 1.6	23 25 17.55	−20 47 15.7	9.140	0.874	3	30, 6	R.	" "
29	11 46 23	+2 6.53	+1 49.2	23 23 2.59	−21 5 50.0	9.142$_n$	0.875	4	30, 6	R.	" "
29	12 15 4	+1 55.54	+3 25.9	23 23 1.65	−21 5 58.0	8.896$_n$	0.879	5	30, 6	R.	" "
29	12 42 1	−1 57.38	−0 27.5	23 23 0.74	−21 6 6.3	8.329$_n$	0.880	6	30, 6	R.	" "
1906											
Dec. 3	10 5 17	−2 17.08	+9 27.8	4 51 38.89	+20 12 32.8	9.381$_n$	0.491	7	17, 4	R.	12-inch
3	10 25 36	−0 55.83	+2 29.6	4 51 38.04	+20 12 35.5	9.305$_n$	0.478	8	25, 5	R.	" "
3	10 51 45	+1 55.15	+2 52.3	4 51 36.94	+20 12 37.8	9.175$_n$	0.463	9	20, 4	R.	" "
3	11 22 20	+3 4.87	+3 27.1	4 51 35.47	+20 12 39.7	8.937$_n$	0.452	10	20, 4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Naut. Almanac 1905. s	′ ″	
1	23 28 1.01	+2.56	−20 14 2.0	+20.0	Algiers, A. G. Zones.....	+1.54	+0 11.0	Seeing good.
2	23 24 47.81	+2.65	−20 49 31.6	+20.1	" " "	+1.62	+0 9.2	Seeing poor; unsteady.
3	23 23 28.32	+2.65	−20 40 34.2	+20.1	" " "	+1.58	+0 9.4	Seeing poor; unsteady.
4	23 20 53.36	+2.70	−21 7 59.3	+20.1	" " "	+1.64	+0 11.7	Seeing poor; unsteady.
5	23 21 3.41	+2.70	−21 9 44.0	+20.1	" " "	+1.68	+0 11.4	Seeing poor.
6	23 24 55.43	+2.69	−21 5 58.9	+20.1	" " "	+1.68	+0 10.2	Seeing poor.
						Naut. Almanac 1906.		
7	4 53 52.29	+3.68	+20 3 4.6	+ 0.4	Berlin A, A. G. 1365	+1.38	+0 6.9	Unst.; wind shakes telescope.
8	4 52 30.18	+3.69	+20 10 5.4	+ 0.5	½ (Ber. A, A. G. 1359+Ber. B, A. G. 1582).	+1.41	+0 7.8	Unst.; wind shakes telescope.
9	4 49 38.10	+3.69	+20 9 44.8	+ 0.7	½ (Ber. A, A. G. 1346+Ber. B, A. G. 1568).	+1.46	+0 7.7	Unst.; wind shakes telescope.
10	4 48 26.91	+3.69	+20 9 11.8	+ 0.8	½ (Ber. A, A. G. 1337+Ber. B, A. G. 1553).	+1.33	+0 6.8	Unst.; wind shakes telescope.

(2) PALLAS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 28	11 2 45	−0 37.38	+4 23.6	16 5 13.53	+26 19 18.1	8.918$_n$	0.285	1	30, 6	R.	12-inch
June 14	12 12 56	+2 40.91	−0 42.2	15 52 19.82	+26 3 42.9	9.381	0.359	2	30, 6	R.	" "
22	12 22 39	−0 39.11	−1 37.0	15 47 47.42	+25 26 35.0	9.509	0.431	3	30, 6	R.	" "
July 26	10 15 32	−3 4.92	−0 42.2	15 43 13.09	+20 37 23.7	9.518	0.527	4	25, 5	R.	" "
30	10 47 29	−1 31.38	−4 5.2	15 44 14.99	+19 55 12.4	9.596	0.580	5	30, 6	R.	" "
Aug. 6	9 53 56	+2 29.85	+6 9.8	15 46 44.93	+18 40 46.0	9.548	0.569	6	25, 5	R.	" "
1906											
Oct. 13	10 18 35	+1 15.08	−2 59.7	0 50 17.67	−14 28 35.1	9.118$_n$	0.843	7	25, 5	R.	12-inch
13	10 40 17	+2 39.46	−4 2.1	0 50 16.98	−14 28 48.3	8.943$_n$	0.846	8	20, 4	R.	" "
13	11 0 12	−2 37.41	−5 26.5	0 50 16.38	−14 28 59.2	8.673$_n$	0.847	9	20, 4	R.	" "
13	11 38 41	−3 15.40	+5 23.5	0 50 15.00	−14 29 20.6	8.510	0.847	10	20, 4	R.	" "
29	8 40 38	−1 20.28	+8 52.3	0 38 57.79	−17 35 49.6	9.256$_n$	0.855	11	24, 5	R.	" "
29	9 1 51	−2 46.32	+7 12.9	0 38 57.18	−17 35 56.7	9.141$_n$	0.859	12	19, 4	R.	" "

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(2) PALLAS—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Naut. Almanac 1904. s	′ ″	
1	16 5 48.69	+2.22	+26 14 51.1	+ 3.4	Camb., Eng., A. G. 7507.....	−2.06	+0 0.3	Seeing good.
2	15 49 36.71	+2.20	+26 4 18.0	+ 7.1	" " " 7384.....	−1.86	+0 1.7	
3	15 48 24.35	+2.18	+25 28 3.4	+ 8.6	" " " 7376.....	−1.88	−0 0.4	Seeing good.
4	15 46 16.12	+1.89	+20 37 53.4	+12.5	Berlin B, A. G. 5428	−1.63	−0 1.8	Seeing good.
5	15 45 44.53	+1.84	+19 59 5.0	+12.6	½ (Ber. A, A. G. 5662+Ber. B, A. G. 5425).	−1.63	−0 2.3	Seeing fair.
6	15 44 13.34	+1.74	+18 34 23.3	+12.9	Berlin A, A. G. 5657.....	−1.40	−0 0.8	Seeing good.
						Naut. Almanac 1906.		
7	0 48 59.92	+2.67	−14 25 50.6	+15.2	Washington, A. G. 223.....	−2.94	+0 5.8	Seeing unst. and diffuse.
8	0 47 34.85	+2.67	−14 25 1.4	+15.2	" " 220.....	−2.91	+0 5.3	Seeing poor.
9	0 52 51.12	+2.67	−14 23 47.9	+15.2	" " 236.....	−2.84	+0 5.9	Seeing poor to fair.
10	0 53 27.73	+2.67	−14 34 59.2	+15.1	" " 240.....	−2.92	+0 6.9	Seeing poor to fair.
11	0 40 15.42	+2.65	−17 44 54.8	+12.9	" " 190.....	−2.64	+0 8.0	Seeing unst. and diffuse.
12	0 41 40.85	+2.65	−17 43 22.5	+12.9	" " 195.....	−2.68	+0 9.2	Seeing poor to fair.

(3) JUNO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 3	13 34 55	+1 1.50	−7 45.7	20 57 12.12	−3 56 25.9	9.231	0.772	1	35, 7	R.	12-inch
5	13 38 50	+1 43.29	+1 54.0	20 55 29.97	−4 10 35.3	9.291	0.774	2	25, 5	R.	" "
11	11 39 7	+1 21.99	−1 49.4	20 50 26.66	−4 55 50.9	8.279	0.783	3	30, 6	R.	" "
12	11 21 20	+2 17.92	−0 22.9	20 49 36.44	−5 3 50.8	7.850_n	0.784	4	30, 6	R.	" "
15	11 54 58	+1 45.21	−0 48.3	20 47 4.74	−5 28 54.6	8.948	0.786	5	30, 6	R.	" "
16	12 2 3	−2 4.47	−6 24.7	20 46 15.13	−5 37 26.2	9.049	0.787	6	25, 5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Naut. Almanac 1904. s	′ ″	
1	20 56 7.60	+3.02	−3 49 0.0	+19.8	Straszburg, A. G. 7328.....	−0.63	−0 5.6	Seeing good.
2	20 53 43.64	+3.04	−4 12 49.3	+20.0	" " 7314.....	−0.65	−0 3.6	Seeing good.
3	20 49 1.59	+3.08	−4 54 22.0	+20.5	" " 7276.....	−0.70	−0 2.3	Seeing unst.
4	20 47 15.44	+3.08	−5 3 48.4	+20.5	" " 7268.....	−0.70	−0 3.1	Seeing good.
5	20 45 16.44	+3.09	−5 28 26.9	+20.6	" " 7248.....	−0.66	−0 2.3	Seeing good.
6	20 48 16.51	+3.09	−5 31 22.2	+20.7	" " 7271.....	−0.72	−0 2.8	Seeing good.

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(5) ASTRAEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 13	9 28 36	+0 33.78	+0 9.1	5 11 55.22	+14 33 8.3	9.424_n	0.591	1	30, 6	Hd.	12-inch
14	9 14 54	−0 26.94	+0 20.6	5 10 54.52	+14 33 19.7	9.448_n	0.595	2	30, 6	Hd.	" "
22	10 13 13	−2 38.86	−9 23.7	5 2 53.49	+14 38 35.9	8.990_n	0.559	3	29, 6	Hd.	" "
23	10 23 28	+2 40.56	−3 40.7	5 1 55.94	+14 39 46.3	8.825_n	0.556	4	30, 6	Hd.	" "
28	8 40 59	−0 7.10	+9 17.9	4 57 30.08	+14 46 52.0	9.343_n	0.576	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	5 11 16.74	+4.70	+14 33 3.1	−3.9	Leipzig I, A. G. 1578.....	....	.. ....	Seeing very unst.
2	5 11 16.74	+4.72	+14 33 3.1	−4.0	" " " 1578.....	....	.. ....	Seeing steady, but thick.
3	5 5 27.56	+4.79	+14 48 3.3	−3.7	" " " 1541.....	....	.. ....	Seeing good.
4	4 59 10.60	+4.78	+14 43 29.9	−2.9	" " " 1483.....	....	.. ....	Seeing fair.
5	4 57 32.39	+4.79	+14 37 37.1	−3.0	" " " 1476.....	....	.. ....	Seeing good.

(6) HEBE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1895	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 23	10 49 27	−0 19.61	− 4 1.8	11 27 20.48	+13 49 7.2	9.439_n	0.603	1	18, 4	F.	9.6-inch
28	10 42 22	−2 3.82	+ 3 47.3	11 23 10.95	+14 40 40.9	9.392_n	0.584	2	5, 1	F.	" "
Mar. 21	11 18 52	+2 3.01	− 0 4.9	11 5 13.20	+17 46 11.7	8.376	0.498	3	30, 6	F.	" "
22	11 29 42	+1 15.56	+ 6 46.5	11 4 25.75	+17 53 3.2	8.751	0.497	4	20, 4	F.	" "
25	10 2 57	+1 1.74	− 6 4.5	11 2 14.17	+18 12 6.3	8.982_n	0.495	5	19, 4	F.	" "
28	10 39 30	−1 5.90	+11 22.5	11 0 6.51	+18 29 33.6	7.986	0.483	6	20, 4	F.	" "
1897 Nov. 19	12 21 26	+0 25.03	+ 0 32.6	5 13 43.75	− 2 37 56.9	9.031_n	0.763	7	20, 4	F.	12-inch
1899 Apr. 5	11 30 48	−0 31.96	− 7 45.7	12 24 12.31	+15 4 26.3	7.872	0.547	8	20, 4	F.	12-inch
1903 Apr. 17	12 14 32	+0 5.84	+13 41.2	13 40 25.58	+11 5 7.7	8.476	0.611	9	28, 6	K.	12-inch
21	11 14 23	−0 49.23	−13 31.7	13 37 0.21	+11 28 21.2	8.729_n	0.606	10	30, 6	K.	" "
27	12 1 29	−1 7.04	− 0 12.3	13 31 54.99	+11 57 2.9	9.001	0.601	11	30, 6	K.	" "
28	10 1 6	−1 51.83	+ 3 23.9	13 31 10.20	+12 0 39.2	9.126_n	0.600	12	39, 6	K.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						B. J. 1897.		
	h m s	s	° ′ ″	″		s	′ ″	
1	11 27 38.02	+2.07	+13 53 20.6	−11.6	Leipzig I, A. G. 4327.....	+3.92	−0 5.7	
2	11 25 12.65	+2.12	+14 37 5.0	−11.4	Bonn VI, +14° 2395.....	+3.34	−0 8.0	$\Delta\delta$ diminished by 1 rev.
3	11 3 7.85	+2.34	+17 46 25.8	− 9.2	Berlin A, A. G. 4366.....	+3.37	−0 2.0	

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(6) HEBE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1897. s	′ ″	
4	11 3 7.85	+2.34	+17 46 25.8	− 9.1	Berlin A, A. G. 4366	+3.00	−0 5.6	
5	11 1 10.10	+2.33	+18 18 19.4	− 8.6	" " " 4356	+3.63	+0 1.7	
6	11 1 10.10	+2.31	+18 18 19.4	− 8.3	" " " 4356	....	.. ...	
						B. J. 1899.		
7	5 13 13.97	+4.75	− 2 38 43.1	+13.6	Straszburg, A. G. 1488	+1.84	+0 7.7	
						B. J. 1901.		
8	12 24 41.16	+3.11	+15 12 30.6	−18.6	Berlin A, A. G. 4691	+4.41	−0 5.9	
9	13 40 17.45	+2.29	+10 51 36.4	− 9.9	Leipzig I, A. G. 4923	....	.. ...	Seeing excellent.
10	13 37 47.14	+2.30	+11 42 2.5	− 9.6	" " " 4914	....	.. ...	Seeing good.
11	13 32 59.72	+2.31	+11 57 24.1	− 8.9	" " " 4893	....	.. ...	Seeing good.
12	13 32 59.72	+2.31	+11 57 24.1	− 8.8	" " " 4893	....	.. ...	Seeing fair, at times diffuse.

(7) IRIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
May 17	11 51 23	+1 43.81	− 6 28.0	16 9 42.94	−23 37 29.2	8.876_n	0.889	1	20, 4	F.	12-inch
18	12 2 33	+0 42.43	.. ....	16 8 41.58	.. ..	8.605_n	.....	2	20, .	F.	" "
31	11 16 2	−0 50.34	−12 47.8	15 55 24.74	−22 37 7.1	7.162_n	0.887	3	15, 3	F.	" "
June 6	10 44 55	+0 53.73	+18 36.4	15 49 37.70	−22 9 29.3	7.717_n	0.885	4	20, 4	F.	" "
9	11 0 11	−0 33.77	−15 12.2	15 46 52.59	−21 55 26.0	8.770	0.883	5	20, 4	F.	" "
1904											
Jan. 5	9 11 48	−0 33.84	− 1 44.5	7 3 13.36	+18 8 57.7	9.521_n	0.566	6	30, 6	Hd.	12-inch
7	9 56 34	−1 41.64	+ 5 8.4	7 0 56.55	+18 5 53.0	9.379_n	0.529	7	30, 6	Hd.	" "
7	10 22 18	−1 47.67	− 3 33.6	7 0 55.12	+18 5 51.1	9.281_n	0.515	8	30, 6	Hd.	" "
9	9 54 11	+1 21.00	+ 2 26.9	6 58 43.69	+18 3 1.8	9.352_n	0.525	9	30, 6	Hd.	" "
9	10 27 43	+2 5.38	− 3 35.4	6 58 42.11	+18 3 0.8	9.205_n	0.508	10	30, 6	Hd.	" "
1906											
July 26	12 10 50	−1 30.19	− 7 58.6	20 35 9.85	−11 24 34.6	8.232_n	0.829	11	30, 6	R.	12-inch
26	12 10 50	−2 25.11	− 6 25.3	20 35 10.00	−11 24 33.6	8.232_n	0.829	12	30, 6	R.	" "
Aug. 15	11 32 38	−0 28.53	− 7 20.6	20 14 53.92	−12 2 16.2	9.025	0.830	13	21, 7	R.	" "
15	11 52 6	−1 9.39	+ 1 13.5	20 14 53.31	−12 2 17.6	9.159	0.828	14	20, 4	R.	" "
15	12 12 52	−1 33.28	+ 8 4.8	20 14 52.48	−12 2 19.7	9.265	0.826	15	25, 5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 3483. s	′	
1	16 7 55.32	+3.81	−23 30 48.4	−12.8	Cordoba Gen. Cat. 21987	+3	+0.1	
2	16 7 55.32	+3.83	−23 30 48.4	....	" " " 21987	+3	...	
3	15 56 11.15	+3.93	−22 24 5.3	−14.0	Algiers, A. G. Zones	+3	0.0	
4	15 48 39.99	+3.98	−22 27 51.0	−14.7	" " "	+3	−0.1	
5	15 47 22.39	+3.97	−21 39 58.9	−14.9	" " "	+2	0.0	

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(7) IRIS—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. to APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 3483. s	′	
6	7 3 45.71	+1.49	+18 10 54.0	−11.8	Berlin A, A. G. 2644	..	...	Seeing good.
7	7 2 36.68	+1.51	+18 0 56.4	−11.8	" " " 2620	..	...	
8	7 2 41.28	+1.51	+18 9 36.5	−11.8	" " " 2622	..	...	
9	6 57 21.16	+1.53	+18 0 46.7	−11.8	" " " 2560	..	...	
10	6 56 35.20	+1.53	+18 6 48.0	−11.8	" " " 2547	..	...	
11	20 36 37.67	+2.37	−11 16 50.0	+14.0	Camb., U. S., A. G. Zones	..	...	Seeing good.
12	20 37 32.74	+2.37	−11 18 22.3	+14.0	" " " "	..	...	Seeing good.
13	20 15 19.96	+2.49	−11 55 10.0	+14.4	" " " "	..	...	Seeing good.
14	20 16 0.21	+2.49	−12 3 45.5	+14.4	" " " "	..	...	Seeing good.
15	20 16 23.27	+2.49	−12 10 38.9	+14.4	" " " "	..	...	Seeing good to fair.

(8) FLORA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 27	12 17 43	−1 9.40	+8 5.8	4 45 34.64	+14 12 59.9	7.727	0.562	1	20, 4	F.	12-inch
Dec. 3	11 33 56	−0 2.79	−1 59.7	4 38 53.52	+14 24 15.1	8.354n	0.559	2	14, 3	F.	" "
4	10 18 17	−1 5.94	+0 7.6	4 37 50.38	+14 26 22.3	9.217n	0.571	3	20, 4	F.	" "
1904											
Feb. 8	11 2 44	−0 5.41	+0 12.8	10 44 47.43	+14 47 24.9	9.461n	0.594	4	30, 6	Hd.	12-inch
11	11 24 42	−2 0.38	+1 21.8	10 42 3.09	+15 13 41.4	9.354n	0.571	5	30, 6	Hd.	" "
20	10 20 14	+1 42.23	−1 13.3	10 33 8.59	+16 30 35.4	9.421n	0.562	6	25, 5	Hd.	" "
20	10 38 5	−0 44.99	+1 58.8	10 33 7.81	+16 30 40.9	9.365n	0.553	7	30, 6	Hd.	" "
20	10 56 15	−1 21.28	−0 9.3	10 33 7.10	+16 30 48.1	9.297n	0.544	8	30, 6	Hd.	" "
1907											
Jan. 4	10 18 33	−1 13.75	−6 13.9	7 46 42.00	+20 58 19.3	9.484n	0.507	9	20, 4	R.	12-inch
4	10 37 41	−1 15.67	−6 8.1	7 46 40.99	+20 58 24.6	9.434n	0.490	10	20, 4	R.	" "
10	10 47 32	−2 30.54	−3 55.5	7 39 50.13	+21 39 11.8	9.294n	0.446	11	25, 5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1898. s	′ ″	
1	4 46 38.92	+5.12	+14 4 38.0	+16.1	Newcomb's Fund. Cat. 306	−10.88	−1 4.4	
2	4 38 51.11	+5.20	+14 25 58.2	+16.6	Leipzig I, A. G. 1368	− 7.99	−1 7.8	
3	4 38 51.11	+5.21	+14 25 58.2	+16.5	" " " 1368	− 7.86	−1 8.6	
4	10 44 51.36	+1.48	+14 47 25.5	−13.4	½ (Ber. A, A. G. 4273+Leip. I, A. G. 4128).	....	.. ....	Seeing good.
5	10 44 1.94	+1.53	+15 12 33.3	−13.7	Berlin A, A. G. 4265	....	.. ....	Seeing fine.
6	10 31 24.70	+1.66	+16 32 2.6	−13.9	" " " 4199	....	.. ....	Seeing good.
7	10 33 51.15	+1.65	+16 28 56.0	−13.9	" " " 4215	....	.. ....	Seeing fine.
8	10 34 26.73	+1.65	+16 31 11.3	−13.9	" " " 4220	....	.. ....	Seeing fine.

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(8) FLORA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Mon. Notices 66, p. 548.		
	h m s	s	° ′ ″	″		s	′ ″	
9	7 47 55.35	+0.40	+21 4 39.3	− 6.1	Berlin B, A. G. 3162	− 9.97	+0 44.1	Seeing good.
10	7 47 56.26	+0.40	+21 4 38.8	− 6.1	" " " 3163	−10.07	+0 45.5	Seeing fair.
11	7 42 20.17	+0.50	+21 43 13.6	− 6.3	" " " 3121	−10.23	+0 45.3	Seeing good to fair; unst. at times.

(9) METIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 5	9 55 5	−0 30.65	+ 2 41.7	12 48 45.85	+3 12 6.4	9.362$_n$	0.713	1	27, 8	Hd.	12-inch
8	9 11 56	−0 47.55	−10 29.3	12 45 55.31	+3 24 20.7	9.444$_n$	0.713	2	17, 6	Hd.	" "
9	11 45 2	−1 50.31	− 6 13.0	12 44 52.55	+3 28 37.0	8.261	0.705	3	28, 6	Hd.	" "
10	9 54 28	−0 37.86	− 9 16.9	12 44 0.99	+3 32 5.1	9.274$_n$	0.708	4	29, 6	Hd.	" "
17	9 22 13	−1 33.19	+ 1 7.5	12 37 48.57	+3 53 53.1	9.268$_n$	0.704	5	29, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	12 49 14.21	+2.29	+3 9 37.5	−12.8	Albany, A. G. 4600	....	.. ....	
2	12 46 40.56	+2.30	+3 35 2.8	−12.8	" " 4586	....	.. ....	
3	12 46 40.56	+2.30	+3 35 2.8	−12.8	" " 4586	....	.. ....	
4	12 44 36.55	+2.30	+3 41 34.8	−12.8	" " 4575	....	.. ....	
5	12 39 19.47	+2.29	+3 52 58.2	−12.6	" " 4555	....	.. ....	

(10) HYGIEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 24	12 1 16	+1 59.69	−2 11.3	8 19 20.73	+17 54 7.0	8.076$_n$	0.495	1	30, 6	Hd.	12-inch
24	12 24 29	+1 47.12	−4 14.1	8 19 19.96	+17 54 9.8	8.566	0.496	2	30, 6	Hd.	" "
25	10 34 48	+2 5.20	+1 44.9	8 18 32.14	+17 55 55.2	9.254$_n$	0.515	3	30, 6	Hd.	" "
25	11 5 43	+2 29.85	−1 45.5	8 18 30.95	+17 55 56.9	9.070$_n$	0.503	4	30, 6	Hd.	" "
30	9 55 16	−1 28.87	−3 18.8	8 14 16.00	+18 5 24.4	9.321$_n$	0.520	5	30, 6	Hd.	" "
Feb. 1	11 2 3	+1 3.71	−4 19.3	8 12 32.34	+18 9 13.0	8.748$_n$	0.492	6	30, 6	Hd.	" "

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(10) HYGIEA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	8 17 19.44	+1.60	+17 56 31.7	−13.4	Berlin A, A. G. 3309.....	....	.. ....	Seeing poor; woolly.
2	8 17 31.24	+1.60	+17 58 37.3	−13.4	" " " 3310.....	....	.. ....	Seeing poor; woolly.
3	8 16 25.34	+1.60	+17 54 23.8	−13.5	" " " 3299.....	....	.. ....	Seeing good.
4	8 15 59.49	+1.61	+17 57 55.9	−13.5	" " " 3293.....	....	.. ....	Seeing good.
5	8 15 43.23	+1.64	+18 8 56.9	−13.7	" " " 3289.....	....	.. ....	Seeing fair.
6	8 11 26.97	+1.66	+18 13 45.9	−13.6	" " " 3263.....	....	.. ....	Seeing poor; fuzzy.

(11) PARTHENOPE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1895	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 31	11 51 18	+1 12.56	+ 1 34.1	7 27 35.25	+21 2 31.6	9.158	0.444	1	20, 4	F.	9.6-inch
1896											
Apr. 22	12 35 19	+2 24.46	− 4 57.6	14 38 19.66	− 7 18 5.9	7.911	0.801	2	12, 4	F.	12-inch
1897											
Sept. 24	10 16 29	+1 33.45	+ 2 48.4	1 13 27.90	− 0 11 20.2	9.468_n	0.742	3	15, 3	F.	12-inch
27	11 45 39	+1 39.94	− 9 3.5	1 10 59.32	− 0 32 8.5	9.047_n	0.745	4	20, 4	F.	" "
29	12 0 17	−2 12.14	+13 35.5	1 9 20.36	− 0 45 43.8	8.806_n	0.747	5	14, 4	F.	" "
1899											
Jan. 14	11 16 38	−1 44.51	− 2 28.2	9 5 20.56	+16 53 45.3	9.413_n	0.555	6	19, 4	F.	12-inch
21	11 6 58	−1 36.72	+ 1 34.3	8 59 1.98	+17 32 26.5	9.333_n	0.531	7	20, 4	F.	" "
1901											
Oct. 16	9 43 25	−1 30.11	− 3 31.3	2 41 21.77	+ 7 27 27.8	9.545_n	0.688	8	34, 7	Hd.	12-inch
1903											
Jan. 30	11 0 6	+1 55.53	− 6 38.4	10 8 22.70	+13 43 10.4	9.461	0.608	9	25, 5	Hd.	12-inch
Feb. 5	10 43 55	+1 10.08	− 1 48.8	10 3 21.70	+14 21 58.9	9.430_n	0.594	10	30, 6	Hd.	" "
9	10 45 13	+2 22.84	+ 0 21.2	9 59 45.86	+14 48 34.8	9.368_n	0.579	11	23, 6	Hd.	" "
12	10 58 51	−0 16.47	+ 3 19.8	9 56 58.32	+15 8 38.0	9.258_n	0.563	12	23, 6	Hd.	" "
1904											
June 12	11 26 36	+0 23.97	− 7 56.4	17 27 50.66	−17 33 26.5	8.887_n	0.862	13	30, 6	Hd.	12-inch
13	10 52 32	+2 39.94	− 3 29.9	17 26 52.31	−17 34 18.1	9.136_n	0.859	14	30, 6	Hd.	" "
14	11 2 26	+1 26.42	+ 8 48.8	17 25 51.96	−17 35 12.7	9.028_n	0.861	15	30, 6	Hd.	" "
18	10 43 31	−2 13.86	+ 4 17.3	17 21 54.32	−17 39 30.8	9.021_n	0.861	16	25, 5	Hd.	" "
18	11 1 55	−2 14.77	+ 4 7.4	17 21 53.57	−17 39 31.0	8.826_n	0.863	17	20, 4	Hd.	" "
1905											
Nov. 21	13 30 56	−3 58.90	− 3 12.7	3 45 46.14	+12 34 28.4	9.326	0.606	18	20, 4	Fn.	12-inch
21	14 8 52	+1 28.81	− 2 55.8	3 45 44.65	+12 34 22.8	9.444	0.620	19	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1897. s	′ ″	
1	7 26 20.76	+1.93	+21 0 53.0	+ 4.5	Bonn VI, +21° 1631	−0.54	+0 0.9	
						B. J. 1898.		
2	14 35 52.51	+2.69	− 7 12 49.4	−18.9	Wein-Ottakring, A. G. 5158	−0.83	+0 3.0	$\Delta\delta$ increased by 2 revs.

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(11) PARTHENOPE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″				
						B. J. 1899.		
						s	′ ″	
3	1 11 50.13	+4.32	− 0 14 37.8	+29.2	Nicolajew, A. G. 238	+2.34	+0 10.8	
4	1 9 15.03	+4.35	− 0 23 34.2	+29.2	" " 230	+2.26	+0 20.5	
5	1 11 28.13	+4.37	− 0 59 48.6	+29.3	" " 237	+4.53	+0 24.8	
						B. J. 1901.		
6	9 7 2.42	+2.65	+16 56 24.3	−10.8	Berlin A, A. G. 3725	+0.03	+0 5.0	
7	9 0 35.92	+2.78	+17 31 3.2	−11.0	" " " 3673	−0.16	+0 6.7	
						B. J. 1903.		
8	2 42 47.37	+4.51	+ 7 30 41.0	+18.1	Leipzig II, A. G. 1033	+2.93	+0 11.1	
9	10 6 25.33	+1.84	+13 50 4.0	−15.2	Leipzig I, A. G. 3962	....	.. ....	
10	10 2 9.68	+1.94	+14 24 3.2	−15.5	" " " 3948	....	.. ....	
11	9 57 21.02	+2.00	+14 48 29.4	−15.8	" " " 3928	....	.. ....	
12	9 57 12.76	+2.03	+15 5 34.1	−15.9	Berlin A, A. G. 4017	....	.. ....	
13	17 27 23.84	+2.85	−17 25 37.5	+ 7.4	Washington, A. G. 6291	....	.. ....	Seeing good.
14	17 24 9.51	+2.86	−17 30 55.4	+ 7.2	" " 6267	....	.. ....	Seeing unst.
15	17 24 22.66	+2.88	−17 44 8.8	+ 7.3	" " 6269	....	.. ....	Seeing good.
16	17 24 5.26	+2.92	−17 43 55.3	+ 7.2	" " 6265	....	.. ....	Seeing good.
17	17 24 5.42	+2.92	−17 43 45.6	+ 7.2	" " 6266	....	.. ....	Seeing good.
18	3 49 41.39	+3.65	+12 37 36.1	+ 5.0	Leipzig I, A. G. 1137	....	.. ....	Seeing unst.
19	3 44 12.20	+3.64	+12 37 13.1	+ 5.5	" " " 1112	....	.. ....	Star has a ft. comp. s. pr.

(12) VICTORIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
May 7	12 14 6	+2 18.42	−1 39.3	15 12 18.48	−19 53 4.4	7.423	0.875	1	30, 6	Hd.	12-inch
8	10 55 43	+0 10.53	−5 46.2	15 11 26.01	−19 44 18.5	9.174n	0.868	2	30, 6	Hd.	" "
9	9 38 57	−0 42.72	+3 4.2	15 10 32.77	−19 35 28.2	9.457n	0.847	3	30, 6	Hd.	" "
11	10 26 42	−1 42.79	−5 8.3	15 8 36.99	−19 16 12.4	9.254n	0.863	4	30, 6	Hd.	" "
11	10 51 16	+0 45.27	+0 55.0	15 8 35.62	−19 16 6.2	9.114n	0.867	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	15 9 57.11	+2.95	−19 51 21.0	−4.1	Cincinnati 1885, 2585	....	.. ....	
2	15 11 12.52	+2.96	−19 38 27.9	−4.4	" " 2588	....	.. ....	
3	15 11 12.52	+2.97	−19 38 27.9	−4.5	" " 2588	....	.. ....	
4	15 10 16.81	+2.97	−19 10 59.7	−4.4	" " 2587	....	.. ....	
5	15 7 47.37	+2.98	−19 16 56.6	−4.6	Radcliffe 1890, 3927	....	.. ....	

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(13) EGERIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 28	10 34 46	−0 14.37	+11 21.4	3 41 35.08	+29 17 12.7	8.919$_n$	0.171	1	29, 6	Hd.	12-inch
30	8 21 37	+1 26.09	− 0 56.7	3 39 13.26	+29 22 21.7	9.527$_n$	0.345	2	24, 5	Hd.	" "
30	8 41 40	+1 4.33	− 0 25.3	3 39 12.38	+29 22 23.2	9.477$_n$	0.308	3	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	3 41 44.82	+4.63	+29 5 44.9	+6.4	Camb., Eng., A. G. 1847	....	.. ....	Seeing fair.
2	3 37 42.53	+4.64	+29 23 11.3	+7.1	" " " 1809	....	.. ....	Seeing fair.
3	3 38 3.40	+4.65	+29 22 41.5	+7.0	" " " 1815	....	.. ....	Seeing fair.

(14) IRENE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 30	10 5 27	−0 26.63	+ 3 11.2	4 29 5.41	+17 3 9.7	9.338$_n$	0.540	1	30, 6	Hd.	12-inch
Dec. 3	10 32 59	−0 25.59	+ 5 17.8	4 25 52.61	+17 5 19.2	9.131$_n$	0.522	2	30, 6	Hd.	" "
3	10 33 53	+0 5.06	+ 1 34.8	4 25 52.55	+17 5 19.2	9.126$_n$	0.521	3	30, 6	Hd.	" "
5	11 27 54	+0 25.11	+ 2 37.6	4 23 42.33	+17 6 56.9	7.130$_n$	0.510	4	30, 6	Hd.	" "
5	11 45 21	−1 23.94	− 4 19.9	4 23 41.76	+17 6 54.5	8.546	0.511	5	30, 6	Hd.	" "
1905											
May 8	11 25 27	+0 39.36	+ 5 26.3	14 39 13.22	− 3 27 13.1	8.229$_n$	0.771	6	25, 5	Fn.	12-inch
8	11 52 13	−0 29.06	−13 23.2	14 39 12.06	− 3 27 17.3	8.565	0.771	7	29, 6	Fn.	" "
8	12 38 43	+3 32.67	+ 7 20.5	14 39 10.17	− 3 27 17.7	9.108	0.770	8	35, 7	Fn.	" "
19	13 55 34	−2 11.31	+ 6 37.1	14 29 48.86	− 3 45 22.5	9.537	0.762	9	25, 5	Fn.	" "
23	10 55 8	+1 55.56	− 7 23.2	14 27 0.95	− 3 56 51.5	8.811	0.775	10	25, 5	Fn.	" "
23	12 12 48	+3 52.14	+ 0 43.8	14 26 58.66	− 3 57 1.5	9.327	0.771	11	19, 4	Fn.	" "
27	12 53 42	+2 19.09	−11 39.0	14 24 27.95	− 4 11 30.2	9.490	0.767	12	20, 4	Fn.	" "
28	10 38 35	+2 46.20	−13 31.6	14 23 57.39	− 4 15 7.9	8.886	0.777	13	23, 5	Fn.	" "
June 3	12 38 12	−2 45.73	+ 5 1.4	14 21 5.88	− 4 42 42.9	9.520	0.768	14	23, 5	Fn.	" "
3	12 58 30	−0 47.11	+ 2 2.5	14 21 5.74	− 4 42 44.7	9.554	0.766	15	25, 5	Fn.	" "
1907											
Nov. 4	12 25 24	−1 38.99	+ 7 37.4	3 40 6.95	+11 1 35.5	8.640$_n$	0.612	16	25, 5	Fn.	12-inch
4	12 45 54	−1 26.20	−13 24.7	3 40 6.16	+11 1 32.5	7.278$_n$	0.611	17	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 29 27.40	+4.64	+16 59 57.2	+1.3	Berlin A, A. G. 1227	....	.. ....	Seeing good.
2	4 26 13.52	+4.68	+16 59 59.9	+1.5	" " " 1207	....	.. ....	Seeing fair.

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(14) IRENE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
3	4 25 42.81	+4.68	+17 3 42.8	+1.6	Berlin A, A. G. 1205	....	.. ....	Seeing fair.
4	4 23 12.52	+4.70	+17 4 17.5	+1.8	" " " 1191	....	.. ....	Seeing somewhat unst.
5	4 25 1.00	+4.70	+17 11 12.8	+1.6	" " " 1201	....	.. ....	Seeing somewhat unst.
6	14 38 31.96	+1.90	− 3 32 36.4	−3.0	Straszburg, A. G. 5196	....	.. ....	Seeing good.
7	14 39 39.22	+1.90	− 3 13 51.1	−3.0	" " 5205	....	.. ....	Seeing good.
8	14 42 40.94	+1.90	− 3 34 35.3	−2.9	" " 5214	....	.. ....	Seeing good.
9	14 31 58.25	+1.92	− 3 51 56.9	−2.7	" " 5170	....	.. ....	Seeing fair; bright Moon.
10	14 25 3.47	+1.92	− 3 49 25.3	−3.0	" " 5140	....	.. ....	Seeing excellent.
11	14 23 4.60	+1.92	− 3 57 42.2	−3.1	" " 5131	....	.. ....	Seeing excellent.
12	14 22 6.95	+1.91	− 3 59 48.3	−2.9	" " 5125	....	.. ....	Seeing poor; thick haze.
13	14 21 9.28	+1.91	− 4 1 33.5	−2.8	" " 5120	....	.. ....	Seeing fair.
14	14 23 49.69	+1.92	− 4 47 41.9	−2.4	" " 5135	....	.. ....	Seeing good.
15	14 21 50.94	+1.91	− 4 44 44.7	−2.5	" " 5122	....	.. ....	Seeing good.
16	3 41 43.03	+2.91	+10 53 49.5	+8.6	Leipzig I, A. G. 1094	....	.. ....	Seeing excellent.
17	3 41 29.44	+2.92	+11 14 48.6	+8.6	" " " 1092	....	.. ....	Seeing excellent.

(15) EUNOMIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 21	10 7 48	−0 13.06	− 9 56.3	21 54 53.23	+ 0 18 2.4	9.325_n	0.738	1	30,6	Hd.	12-inch
22	10 3 23	+1 36.41	+ 4 55.8	21 53 53.89	+ 0 18 36.5	9.323_n	0.738	2	30,6	Hd.	" "
23	9 46 41	+0 43.60	+10 5.1	21 52 55.00	+ 0 18 56.5	9.364_n	0.738	3	30,6	Hd.	" "
23	10 14 6	−2 12.22	− 9 5.3	21 52 54.08	+ 0 18 53.6	9.260_n	0.737	4	30,6	Hd.	" "
24	9 33 53	−0 21.25	+ 5 29.5	21 51 56.24	+ 0 19 10.4	9.388_n	0.738	5	30,6	Hd.	" "
Sept. 2	9 59 57	+2 39.07	+ 0 56.1	21 43 15.65	+ 0 15 22.4	9.066_n	0.738	6	30,6	Hd.	" "
2	10 22 39	−2 23.70	− 3 7.0	21 43 14.67	+ 0 15 20.1	8.857_n	0.738	7	30,6	Hd.	" "
3	11 4 40	+1 20.43	− 3 44.6	21 42 18.72	+ 0 14 21.4	8.333	0.738	8	30,6	Hd.	" "
4	11 0 15	+0 48.44	− 1 9.9	21 41 25.02	+ 0 13 16.5	8.349	0.738	9	30,6	Hd.	" "
1905											
Jan. 28	10 57 23	+3 17.66	+ 8 27.5	8 41 17.16	+13 9 34.5	9.167_n	0.588	10	25,5	Hd.	12-inch
Feb. 3	11 43 20	+0 52.70	− 8 6.2	8 34 55.88	+13 9 34.0	7.809	0.579	11	25,5	Hd.	" "
4	9 46 3	+0 49.77	− 6 11.1	8 33 59.18	+13 9 35.6	9.334_n	0.598	12	30,6	Hd.	" "
7	10 8 53	+4 0.28	+ 2 39.2	8 30 57.69	+13 9 53.0	9.161_n	0.588	13	25,5	Hd.	" "
10	10 26 5	+1 48.02	+ 6 11.4	8 28 4.45	+13 10 18.4	8.910_n	0.582	14	30,6	Hd.	" "
14	10 42 46	−2 28.82	+ 3 36.2	8 24 28.59	+13 10 49.8	7.886_n	0.579	15	24,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	11 33 2.82	+1.47	+ 0 27 34.9	+23.8	Nicolajew, A. G. 5546	....	.. ....	Seeing fair.
2	11 33 14.01	+1.47	+ 0 13 16.9	+23.8	" " 5536	....	.. ....	Seeing fair.
3	11 33 7.01	+1.48	+ 0 8 27.5	+23.9	" " 5534	....	.. ....	Seeing good.
4	11 33 2.82	+1.48	+ 0 27 34.9	+24.0	" " 5546	....	.. ....	Seeing good.

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(15) EUNOMIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
5	21 52 14.01	+3.48	+ 0 13 16.9	+24.0	Nicolajew, A. G. 5536	....	.. ....	Seeing poor; unst.
6	21 40 33.09	+3.49	+ 0 14 1.5	+24.8	" " 5506	....	.. ....	Seeing fine.
7	21 45 34.87	+3.50	+ 0 18 2.3	+24.8	" " 5518	....	.. ....	Seeing fine.
8	21 40 54.79	+3.50	+ 0 17 41.2	+24.8	½ (München I, 29431+München II, 11969).	....	.. ....	Seeing good.
9	21 40 33.09	+3.49	+ 0 14 1.5	+24.9	Nicolajew, A. G. 5506	....	.. ....	Seeing good.
10	8 37 58.27	+1.23	+13 1 18.9	−11.9	Leipzig I, A. G. 3515	....	.. ....	Seeing poor.
11	8 34 1.91	+1.27	+13 17 52.5	−12.3	" " " 3492	....	.. ....	Seeing fair.
12	8 33 8.13	+1.28	+13 15 59.0	−12.3	" " " 3486	....	.. ....	Seeing fair.
13	8 26 56.13	+1.28	+13 7 26.1	−12.3	" " " 3436	....	.. ....	Seeing good.
14	8 26 15.14	+1.29	+13 4 19.4	−12.4	" " " 3434	....	.. ....	Seeing good.
15	8 26 56.13	+1.28	+13 7 26.1	−12.5	" " " 3436	....	.. ....	Seeing good.

(16) PSYCHE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1897	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 23	12 29 15	+1 26.00	−1 55.3	10 23 44.83	+10 22 7.0	8.667	0.621	1	20, 4	F.	12-inch
24	10 54 38	+0 42.38	+3 1.5	10 23 1.22	+10 27 3.7	9.129_n	0.625	2	18, 4	F.	" "
1903											
Apr. 28	12 53 48	−0 48.84	+4 6.3	14 44 33.96	−11 32 58.8	8.830	0.829	3	29, 6	Hd.	12-inch.
May 4	10 44 39	+0 47.58	+3 21.2	14 39 52.77	−11 9 2.6	9.133_n	0.824	4	30, 6	Hd.	" "
4	10 44 57	+1 31.24	+3 21.5	14 39 52.49	−11 9 2.1	9.131_n	0.824	5	30, 6	Hd.	" "
7	10 26 10	+1 23.08	−0 19.7	14 37 30.41	−10 57 19.3	9.159_n	0.822	6	30, 6	Hd.	" "
8	10 26 52	+0 35.77	+3 33.1	14 36 43.11	−10 53 26.5	9.126_n	0.822	7	30, 6	Hd.	" "
1905											
Nov. 23	11 59 25	+2 37.92	−0 23.2	4 23 38.54	+16 37 56.4	8.473_n	0.520	8	24, 5	Fn.	12-inch
1907											
Feb. 25	10 55 30	+0 51.31	+7 29.7	10 28 6.99	+10 1 26.5	9.164_n	0.632	9	20, 4	R.	12-inch
25	11 15 57	−3 12.28	−3 44.7	10 28 6.32	+10 1 32.5	9.024_n	0.629	10	20, 4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. J. 395. s	′	
1	10 22 16.16	+2.67	+10 24 14.4	−12.1	Leipzig I, A. G. 4029	+7	−0.5	
2	10 22 16.16	+2.68	+10 24 14.4	−12.2	" " " 4029	+7	−0.5	
3	14 45 20.12	+2.68	−11 36 58.9	− 6.2	Radcliffe 1890, 3835	..	...	
4	14 39 2.46	+2.73	−11 12 17.0	− 6.8	½ (Schjellerup 5220+München I, 10482).	..	...	
5	14 38 18.53	+2.72	−11 12 16.8	− 6.8	München I, 10469	..	...	
6	14 36 4.59	+2.74	−10 56 52.7	− 6.9	Yarnall 6156	..	...	
7	14 36 4.59	+2.75	−10 56 52.7	− 6.9	" 6156	..	...	

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(16) PSYCHE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	″	
8	4 20 56.85	+3.77	+16 38 17.5	+2.1	Berlin A, A. G. 1176.....	..	...	Seeing good.
9	10 27 14.83	+0.85	+ 9 54 3.8	−7.0	Leipzig I, A. G. 4048	..	...	Seeing good.
10	10 31 17.75	+0.85	+10 5 24.1	−6.9	" " " 4065	..	...	Seeing good.

(17) THETIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
May 21	12 13 10	−1 2.68	−0 40.6	17 6 26.55	−14 13 49.6	9.077$_n$	0.843	1	30, 6	Hd.	12-inch
28	12 57 52	+0 12.03	+2 37.0	17 0 32.09	−14 11 12.3	8.608	0.845	2	30, 6	Hd.	" "
28	12 58 10	−0 3.75	+1 13.4	17 0 32.03	−14 11 11.6	8.614	0.845	3	30, 6	Hd.	" "
June 2	11 19 12	−2 24.39	−3 15.4	16 56 0.78	−14 11 55.1	9.049$_n$	0.843	4	30, 6	Hd.	" "
3	11 20 8	+2 21.72	+0 57.3	16 55 4.46	−14 12 18.5	9.002$_n$	0.844	5	30, 6	Hd.	" "
1904											
Oct. 27	11 51 52	+2 49.99	+4 2.4	2 36 17.79	+ 5 56 28.8	8.602$_n$	0.678	6	30, 6	D.	26-inch
27	12 16 1	−2 34.64	+5 9.8	2 36 16.74	+ 5 56 23.1	7.930	0.678	7	30, 6	D.	" "
28	11 48 9	+0 5.55	+9 42.5	2 35 21.01	+ 5 51 50.6	8.576$_n$	0.679	8	10, 10	D.	" "
30	10 32 51	−1 45.17	+0 51.5	2 33 30.31	+ 5 42 59.6	9.219$_n$	0.684	9	40, 7	D.	" "
30	10 54 42	−2 38.47	+3 7.0	2 33 29.47	+ 5 42 56.6	9.094$_n$	0.682	10	30, 6	D.	" "
1906											
Jan. 28	13 11 3	−2 36.58	+2 11.7	8 50 57.00	+18 22 32.7	9.022	0.493	11	25, 5	Fn.	26-inch
29	10 31 7	+1 26.99	−7 28.2	8 50 4.09	+18 27 50.0	9.329$_n$	0.514	12	25, 5	Fn.	" "
29	11 1 45	+2 46.58	−4 33.9	8 50 2.97	+18 27 56.5	9.186$_n$	0.499	13	25, 5	Fn.	" "
Feb. 4	12 51 19	−1 25.03	−6 48.1	8 44 0.01	+19 4 2.7	9.133	0.484	14	25, 5	Fn.	" "
5	11 24 44	+2 55.04	+0 6.5	8 43 4.43	+19 9 30.4	8.548$_n$	0.470	15	25, 5	Fn.	" "
15	9 59 50	+0 1.88	+3 0.6	8 33 45.21	+20 3 18.0	9.048$_n$	0.459	16	25, 5	Fn.	" "
15	10 12 5	−0 34.99	−3 7.8	8 33 44.63	+20 3 19.6	8.936$_n$	0.455	17	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	17 7 26.33	+2.90	−14 13 13.2	+ 4.2	Washington, A. G. 6160.....	+ 9.92	−0 9.3	
2	17 0 17.04	+3.02	−14 13 53.5	+ 4.2	" " 6110.....	+10.30	−0 12.6	
3	17 0 32.76	+3.02	−14 12 29.2	+ 4.2	" " 6111.....	+10.26	−0 11.9	
4	16 58 22.09	+3.08	−14 8 43.8	+ 4.1	" " 6092.....	+10.48	−0 15.2	
5	16 52 39.64	+3.10	−14 13 19.6	+ 3.8	Radcliffe 1890, 4407	+10.48	−0 13.7	
						B. J. 1906.		
6	2 33 24.21	+3.59	+ 5 52 14.2	+12.2	Leipzig II, A. G. 975	− 4.98	−0 21.7	
7	2 38 47.79	+3.59	+ 5 51 1.5	+11.8	" " " 1000.....	− 5.05	−0 22.7	
8	2 35 11.87	+3.59	+ 5 41 56.0	+12.1	" " " 984.....	− 5.22	−0 21.8	
9	2 35 11.87	+3.61	+ 5 41 56.0	+12.1	" " " 984.....	− 5.13	−0 22.4	
10	2 36 4.33	+3.61	+ 5 39 37.5	+12.1	" " " 989.....	− 5.07	−0 21.4	

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(17) THETIS—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS
	h m s	s	° ′ ″	″		B. J. 1908. s	′ ″	
11	8 53 32.70	+0.88	+18 20 30.4	−9.4	Berlin A, A. G. 3617	−24.16	+1 11.3	
12	8 48 36.20	+0.90	+18 35 27.6	−9.4	" " " 3572	−24.40	+1 6.5	
13	8 47 15.49	+0.90	+18 32 39.8	−9.4	" " " 3561	−24.21	+1 5.3	
14	8 45 24.09	+0.95	+19 11 0.3	−9.5	" " " 3545	−24.50	+1 2.7	
15	8 40 8.44	+0.95	+19 9 33.4	−9.5	" " " 3510	−24.56	+1 3.1	
16	8 33 42.36	+0.97	+20 0 26.5	−9.1	Berlin B, A. G. 3469	−24.07	+0 58.3	
17	8 34 18.65	+0.97	+20 6 36.5	−9.1	" " " 3475	−24.19	+0 57.4	

(18) MELPOMENE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 27	10 49 32	−1 39.04	− 1 2.4	10 29 34.99	+13 47 42.5	8.885	0.571	1	10, 2	Hd.	12-inch
Apr. 1	9 46 24	−1 15.32	− 7 22.2	10 26 53.60	+14 13 32.4	7.840_n	0.562	2	27, 7	Hd.	" "
4	9 37 56	+0 54.62	−11 28.4	10 25 33.51	+14 26 45.8	7.427	0.558	3	30, 6	Hd.	" "
5	9 8 28	+0 31.38	− 7 32.4	10 25 10.26	+14 30 41.9	8.692_n	0.558	4	28, 6	Hd.	" "
1904											
June 11	9 46 54	−1 15.95	+ 0 5.8	16 37 36.50	− 5 28 11.9	9.248_n	0.784	5	25, 5	Hd.	12-inch
11	10 7 37	−1 46.95	+ 2 13.0	16 37 35.65	− 5 28 12.5	9.139_n	0.785	6	25, 5	Hd.	" "
12	9 43 29	+4 47.08	− 4 57.8	16 36 36.12	− 5 28 9.6	9.241_n	0.784	7	20, 4	Hd.	" "
17	10 39 0	+3 8.68	− 6 8.2	16 31 39.89	− 5 30 34.9	8.248_n	0.788	8	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	10 31 11.97	+2.06	+13 48 59.9	−15.0	Bonn VI, +14°2267	....	.. ....	Sky thick; poor obs'n.
2	10 28 6.90	+2.02	+14 21 9.2	−14.6	Leipzig I, A. G. 4053	....	.. ....	Poor obs'n.
3	10 24 36.91	+1.98	+14 38 28.6	−14.4	" " " 4042	....	.. ....	
4	10 24 36.91	+1.97	+14 38 28.6	−14.3	" " " 4042	....	.. ....	Good obs'n.
5	16 38 49.83	+2.62	− 5 28 22.4	+ 4.7	Straszburg, A. G. 5731	....	.. ....	Seeing fine.
6	16 39 19.98	+2.62	− 5 30 30.3	+ 4.8	" " 5733	....	.. ....	Seeing fine; est. mag. 9.0.
7	16 31 46.42	+2.62	− 5 23 16.2	+ 4.4	" " 5706	....	.. ....	Seeing good.
8	16 28 28.57	+2.64	− 5 24 31.3	+ 4.6	" " 5691	....	.. ....	Seeing good.

(19) FORTUNA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 12	10 54 38	−2 27.73	−2 47.8	0 43 13.39	+5 30 44.6	8.636_n	0.683	1	15, 3	F.	12-inch

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(19) FORTUNA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1900	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 16	10 58 21	+1 32.52	+ 7 33.1	10 56 0.03	+ 5 0 37.8	8.613$_n$	0.688	2	39,6	La.	12-inch
21	11 7 34	−1 28.66	+ 7 25.7	10 51 55.10	+ 5 29 1.6	8.399	0.683	3	28,5	La.	" "
1904											
Mar. 20	11 9 28	+0 14.58	− 2 5.9	12 11 28.60	− 2 31 6.5	9.132$_n$	0.762	4	30,6	Hd.	12-inch
20	11 27 14	−2 13.05	− 1 30.2	12 11 27.89	− 2 31 1.5	9.006$_n$	0.762	5	29,6	Hd.	" "
27	11 28 22	−0 21.20	+ 2 37.6	12 5 11.78	− 1 46 53.1	8.508$_n$	0.756	6	30,6	Hd.	" "
27	11 34 45	−0 21.96	− 4 16.6	12 5 11.54	− 1 46 48.3	8.289$_n$	0.756	7	30,6	Hd.	" "
27	11 42 11	−0 23.82	− 4 10.4	12 5 11.31	− 1 46 47.6	7.659$_n$	0.756	8	30,6	Hd.	" "
1905											
June 14	13 13 18	+1 21.63	+ 8 4.2	18 34 37.49	−20 59 35.1	8.335	0.880	9	24,5	Fn.	12-inch
14	13 32 43	+0 11.67	+ 3 16.6	18 34 36.88	−20 59 36.3	8.800	0.879	10	24,5	Fn.	" "
25	12 50 51	−0 29.82	− 1 11.4	18 23 43.64	−21 1 50.8	8.949	0.878	11	15,5	Fn.	" "
25	13 15 6	+1 11.53	−10 26.8	18 23 42.77	−21 1 54.5	9.145	0.874	12	23,5	Fn.	" "
July 7	12 5 10	+3 15.17	+ 0 18.9	18 11 22.80	−21 4 34.5	9.072	0.876	13	22,5	Fn.	" "
7	12 51 6	+3 9.94	+ 0 39.5	18 11 20.85	−21 4 39.0	9.324	0.867	14	17,4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1900. s	′ ″	
1	0 45 36.49	+4.63	+ 5 33 2.4	+30.0	Leipzig II, A. G. 284	+ 7.25	+0 44.8	
						B. J. 1902.		
2	10 54 24.59	+2.92	+ 4 53 23.4	−18.7	Leipzig II, A. G. 5653	− 1.21	+0 8.2	
3	10 53 20.85	+2.91	+ 5 21 54.6	−18.7	" " " 5643	− 0.12	−0 4.1	
						B. J. 1906.		
4	12 11 12.11	+1.91	− 2 28 48.9	−11.7	Straszburg, A. G. 4538	− 3.45	+0 18.7	Seeing good.
5	12 13 39.03	+1.91	− 2 29 19.7	−11.6	" " 4551	− 3.47	+0 19.1	Seeing good; very faint.
6	12 5 31.05	+1.93	− 1 49 18.4	−12.3	Nicolajew, A. G. 3364	− 3.51	+0 16.5	Seeing unst.; woolly.
7	12 5 31.57	+1.93	− 1 42 19.4	−12.3	" " 3365	− 3.51	+0 19.6	Seeing unst.; woolly.
8	12 5 33.20	+1.93	− 1 42 24.9	−12.3	" " 3366	− 3.45	+0 18.3	Seeing unst.; woolly.
						B. J. 1907.		
9	18 33 13.43	+2.43	−21 7 49.8	+10.5	Algiers, A. G. Zones	−10.34	−0 0.5	Seeing poor.
10	18 34 22.78	+2.43	−21 3 3.5	+10.6	" " "	−10.17	−0 1.6	Seeing poor; bright Moon.
11	18 24 10.85	+2.61	−21 0 49.6	+10.2	" " "	−10.61	+0 0.1	Seeing poor.
12	18 22 28.63	+2.61	−20 51 37.8	+10.1	Cincinnati 1885, 3017	−10.42	−0 3.5	Seeing poor.
13	18 8 4.90	+2.73	−21 5 2.7	+ 9.3	Newcomb's Fund. Cat. 1166	−10.64	+0 6.6	Seeing good; obs'n. diff.
14	18 8 8.18	+2.73	−21 5 27.8	+ 9.3	Yarnall 7843	−10.63	+0 2.4	Seeing good; obs'n. diff.

(20) MASSALIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
May 17	10 29 30	+0 8.11	+9 47.7	14 49 17.73	−15 50 8.3	8.929$_n$	0.853	1	30,6	Hd.	12-inch
17	10 52 21	−2 20.96	+5 14.3	14 49 16.77	−15 50 4.4	8.578$_n$	0.854	2	30,6	Hd.	" "
19	9 59 41	+1 56.55	−3 22.1	14 47 30.08	−15 41 48.5	9.099$_n$	0.850	3	17,4	Hd.	" "
21	10 11 39	+0 10.82	+4 59.6	14 45 44.36	−15 33 26.7	8.913$_n$	0.852	4	30,6	Hd.	" "
21	10 18 11	+0 22.04	+2 19.4	14 45 44.15	−15 33 25.7	8.836$_n$	0.852	5	30,6	Hd.	" "

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(20) MASSALIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O-C α	O-C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	14 49 6.70	+2.92	−15 59 49.8	−6.2	Washington, A. G. 5503.....	....	.. ....	Poor obs'n.
2	14 51 34.81	+2.92	−15 55 12.7	−6.0	" " 5516.....	....	.. ....	Fair obs'n.
3	14 45 30.62	+2.91	−15 38 19.9	−6.5	Newcomb's Fund. Cat. 936.....	....	.. ....	Poor obs'n. Through clouds.
4	14 45 30.62	+2.92	−15 38 19.9	−6.4	" " " 936.....	....	.. ....	
5	14 45 19.19	+2.92	−15 35 38.6	−6.5	" " " 934.....	....	.. ....	

(21) LUTETIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 14	12 39 14	−0 1.72	+ 2 56.2	13 24 44.88	−4 21 49.0	8.964	0.778	1	30, 6	Hd.	12-inch
16	9 40 14	+1 6.05	− 5 1.6	13 22 58.83	−4 12 29.9	9.372_n	0.772	2	30, 6	Hd.	" "
19	9 38 54	+0 59.16	+ 4 12.9	13 20 10.33	−3 58 1.6	9.326_n	0.771	3	30, 6	Hd.	" "
19	9 57 32	−1 32.04	− 1 0.0	13 20 9.48	−3 57 57.7	9.251_n	0.772	4	30, 6	Hd.	" "
20	11 23 1	−0 19.81	− 4 36.0	13 19 10.66	−3 52 59.8	7.244_n	0.774	5	30, 6	Hd.	" "
1905											
Sept. 21	11 44 10	−2 36.52	+ 4 13.3	0 45 57.74	−1 12 57.0	9.075_n	0.751	6	30, 6	R.	12-inch
21	12 15 2	−0 31.14	−10 12.8	0 45 56.67	−1 13 2.9	8.765_n	0.751	7	30, 6	R.	" "
23	11 15 39	+2 31.90	− 2 25.1	0 44 17.08	−1 23 21.4	9.190_n	0.752	8	30, 6	R.	" "
26	11 19 0	+0 43.58	+ 2 56.2	0 41 39.57	−1 39 4.6	9.084_n	0.755	9	30, 6	R.	" "
26	11 37 31	−0 44.10	+ 1 6.5	0 41 38.92	−1 39 4.2	8.930_n	0.755	10	30, 6	R.	" "
27	12 7 12	−1 28.01	+ 1 34.0	0 40 44.21	−1 44 19.6	8.218_n	0.756	11	30, 6	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O-C α	O-C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	13 24 44.52	+2.08	−4 24 36.3	− 8.9	Straszburg, A. G. 4861.....	....	.. ....	Seeing fair; est. mag. 9.0.
2	13 21 50.70	+2.08	−4 7 19.3	− 9.0	" " 4850.....	....	.. ....	Seeing very bad; unst.
3	13 19 9.08	+2.09	−4 2 5.4	− 9.1	" " 4836.....	....	.. ....	Seeing unst.
4	13 21 39.43	+2.09	−3 56 48.8	− 8.9	" " 4847.....	....	.. ....	Seeing unst., but good obs'n.
5	13 19 28.38	+2.09	−3 48 14.8	− 9.0	" " 4838.....	....	.. ....	Seeing good.
6	0 48 31.40	+2.86	−1 17 27.5	+17.2	Nicolajew, A. G. 164.....	....	.. ....	Seeing fair.
7	0 46 24.95	+2.86	−1 3 7.4	+17.3	" " 154.....	....	.. ....	Seeing fair.
8	0 41 42.30	+2.88	−1 21 13.9	+17.6	" " 136.....	....	.. ....	Seeing fair to poor; unst.
9	0 40 53.08	+2.91	−1 42 18.5	+17.7	" " 132.....	....	.. ....	Seeing good to fair.
10	0 42 20.12	+2.90	−1 40 28.4	+17.7	" " 140.....	....	.. ....	Seeing fair.
11	0 42 9.31	+2.91	−1 46 11.3	+17.7	" " 139.....	....	.. ....	Seeing good.

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(22) KALLIOPE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 7	10 24 58	−1 46.86	−3 44.2	13 55 7.63	+3 5 36.0	9.436$_n$	0.715	1	29, 6	Hd.	12-inch
7	11 3 40	−0 24.26	−2 42.1	13 55 6.26	+3 5 36.9	9.316$_n$	0.713	2	30, 6	Hd.	" "
14	11 7 4	−2 39.24	−4 4.9	13 49 11.93	+3 23 10.8	9.142$_n$	0.708	3	30, 6	Hd.	" "
15	10 39 58	−1 37.79	−2 23.0	13 48 21.39	+3 25 15.6	9.257$_n$	0.709	4	30, 6	Hd.	" "
17	12 18 45	−2 45.84	−8 16.8	13 46 34.50	+3 29 18.3	8.498	0.705	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	13 56 52.56	+1.93	+3 9 27.9	−7.7	Albany, A. G. 4848	.... ′	.. ....	Seeing fair.
2	13 55 28.59	+1.93	+3 8 26.8	−7.8	" " 4836	....	.. ....	Seeing fair; est. mag. 9.8; clouds interrupt.
3	13 51 49.18	+1.99	+3 27 23.3	−7.6	" " 4828	....	.. ....	Seeing fair.
4	13 49 57.18	+2.00	+3 27 46.2	−7.6	" " 4818	....	.. ....	Seeing very bad; unst. and diffuse.
5	13 49 18.33	+2.01	+3 37 42.5	−7.4	" " 4816	....	.. ....	Seeing good; clouds interrupt.

(23) THALIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 6	9 48 33	−0 42.36	+3 52.6	2 26 54.57	+5 58 20.9	9.279$_n$	0.683	1	35, 7	Hd.	12-inch
8	9 37 18	−0 46.11	+7 5.5	2 24 50.32	+5 57 5.4	9.285$_n$	0.683	2	30, 6	Hd.	" "
10	10 22 29	+1 31.15	+4 39.4	2 22 44.65	+5 56 18.7	8.941$_n$	0.679	3	30, 6	Hd.	" "
12	10 19 7	−0 30.66	+4 21.1	2 20 42.85	+5 56 0.4	8.872$_n$	0.678	4	30, 6	Hd.	" "
14	9 47 5	+1 7.38	+1 43.9	2 18 44.68	+5 56 9.7	9.072$_n$	0.680	5	30, 6	Hd.	" "
14	10 4 54	+1 2.07	+1 54.2	2 18 44.05	+5 56 12.0	8.920$_n$	0.679	6	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	2 27 32.90	+4.03	+5 54 14.1	+14.2	Leipzig II, A. G. 994	....	.. ....	Comp. star double; obs'd mean; seeing unst.
2	2 25 32.40	+4.03	+5 49 45.6	+14.3	" " " 935	....	.. ....	Seeing good.
3	2 21 9.46	+4.04	+5 51 24.6	+14.7	" " " 908	....	.. ....	Seeing good.
4	2 21 9.46	+4.05	+5 51 24.6	+14.7	" " " 908	....	.. ....	Seeing good; clouded afterwards.
5	2 17 33.26	+4.04	+5 54 11.0	+14.8	" " " 884	....	.. ....	Seeing fair; somewhat unst.
6	2 17 37.94	+4.04	+5 54 3.0	+14.8	" " " 885	....	.. ....	Seeing fair; somewhat unst.

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(24) THEMIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
May 17	11 26 34	+0 5.17	+3 26.3	14 21 56.75	−14 19 35.4	8.993	0.844	1	20, 5	F.	12-inch
18	11 25 24	−0 34.10	.. ....	14 21 17.48	.. ..	9.022	.....	2	20, .	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		A. N. 3481.		
						s	′ ″	
1	14 21 48.17	+3.41	−14 22 42.6	−19.1	Hedrick's Zodiacal Cat. 923.....	+0.23	−0 5.1	
2	14 21 48.17	+3.41	−14 22 42.6	....	" " " 923.....	+0.43	.. ....	

(26) PROSERPINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1894	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 5	11 42 52	+0 24.33	−16 8.8	4 56 47.74	+25 21 38.6	8.492_n	0.309	1	16, 2	F.	9.6-inch
14	9 54 42	+0 24.75	+ 1 55.1	4 47 36.42	+25 13 37.2	9.226_n	0.346	2	12, 3	F.	" "
17	11 26 23	−2 36.76	− 1 11.2	4 44 34.94	+25 10 31.1	8.803	0.319	3	15, 4	F.	" "
19	10 28 12	−4 29.32	− 3 19.6	4 42 42.38	+25 8 22.8	8.636_n	0.317	4	14, 3	F.	" "
1901											
June 23	9 34 4	−2 52.82	+ 1 28.3	17 35 13.00	−27 23 11.4	9.393_n	0.884	5	18, 3	La.	26-inch
23	9 36 59	+0 28.46	− 2 43.2	17 35 12.93	−27 23 9.3	9.383_n	0.885	6	25, 3	La.	" "
30	9 45 5	+1 30.90	− 0 49.3	17 28 43.59	−27 24 34.8	9.188_n	0.897	7	29, 6	La.	" "
July 1	9 28 6	+0 39.54	− 0 46.9	17 27 52.24	−27 24 32.5	9.256_n	0.894	8	30, 6	La.	" "
1904											
Jan. 13	12 55 5	−0 34.56	+ 4 18.3	7 6 17.80	+27 27 24.3	9.235	0.278	9	30, 6	Hd.	12-inch
16	11 50 55	−3 0.84	− 2 57.7	7 3 15.30	+27 32 34.2	8.805	0.238	10	30, 6	Hd.	" "
1905											
May 2	11 27 19	+1 5.99	− 3 39.7	14 34 7.16	−14 36 16.3	8.714_n	0.848	11	28, 6	Fn.	12-inch
2	12 25 43	+5 46.45	− 0 58.0	14 34 4.87	−14 36 11.6	8.837	0.847	12	19, 4	Fn.	" "
7	11 29 6	+0 16.90	− 0 24.9	14 29 32.37	−14 23 30.3	7.281	0.847	13	18, 6	Fn.	" "
7	11 46 21	−0 10.97	− 0 9.3	14 29 31.71	−14 23 26.4	8.574	0.847	14	18, 6	Fn.	" "
7	12 38 14	−4 37.39	− 7 33.4	14 29 29.91	−14 23 20.4	9.154	0.842	15	18, 4	Fn.	" "
21	12 28 45	−4 46.09	+ 5 4.1	14 18 4.48	−13 52 23.4	9.395	0.828	16	20, 4	Fn.	" "
21	13 3 48	+3 56.31	+ 5 56.0	14 18 3.38	−13 52 20.2	9.487	0.818	17	10, 2	Fn.	" "
23	13 16 22	−2 46.58	− 9 49.7	14 16 41.76	−13 48 57.2	9.530	0.811	18	24, 5	Fn.	" "
1906											
Sept. 8	12 31 12	−1 11.97	− 3 28.9	23 17 15.45	− 9 57 13.5	8.675	0.819	19	25, 5	Fn.	26-inch
23	9 42 50	−0 22.06	+ 3 12.9	23 4 43.35	−10 58 8.4	9.168_n	0.822	20	25, 5	Fn.	" "
23	9 54 19	−1 54.49	+ 2 42.4	23 4 43.02	−10 58 9.4	9.096_n	0.823	21	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 56 18.54	+4.87	+25 37 31.7	+15.7	Camb., Eng., A. G. 2269.....	.....	.. ....	

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(26) PROSERPINA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
2	4 47 6.72	+4.95	+25 11 25.3	+16.8	½ (Ber. B, A. G. 1548+Camb., Eng., A. G. 2208).	.....	.. ....	
3	4 47 6.72	+4.98	+25 11 25.3	+17.0	½ (Ber. B, A. G. 1548+Camb., Eng., A. G. 2208).	.....	.. ....	
4	4 47 6.72	+4.98	+25 11 25.3	+17.1	½ (Ber. B, A. G. 1548+Camb., Eng., A. G. 2208).	.....	.. ....	
5	17 38 1.46	+4.36	−27 24 43.6	+ 3.9	Second Washington Cat. (1875), 3521.	.....	.. ....	
6	17 34 40.11	+4.36	−27 20 29.6	+ 3.5	Cordoba Gen. Cat. 23949.....	.....	.. ....	
7	17 27 8.29	+4.40	−27 23 48.2	+ 2.7	Cordoba Zone Cat. 1751.....	.....	.. ....	
8	17 27 8.29	+4.41	−27 23 48.2	+ 2.6	" " " 1751.....	.....	.. ....	Full Moon; very hazy.
						B. J. 1905.		
9	7 6 50.72	+1.64	+27 23 17.8	−11.8	Camb., Eng., A. G. 3815.....	−83.49	+1 48.8	Seeing good.
10	7 6 14.47	+1.67	+27 35 43.6	−11.7	" " " 3801.....	−84.97	+1 40.5	Seeing unsteady.
						B. J. 1907.		
11	14 32 59.16	+2.01	−14 32 32.8	− 3.8	Washington, A. G. 5414.....	−62.67	+5 59.1	Seeing good.
12	14 28 16.41	+2.01	−14 35 9.5	− 4.1	" " 5398.....	−62.62	+5 57.6	Seeing good.
13	14 29 13.43	+2.04	−14 23 1.3	− 4.1	" " 5403.....	−62.19	+6 0.3	Seeing good.
14	14 29 40.64	+2.04	−14 23 13.0	− 4.1	" " 5404.....	−62.17	+6 2.4	Seeing good.
15	14 34 5.26	+2.04	−14 15 43.2	− 3.8	" " 5419.....	−61.94	+6 2.9	Seeing good.
16	14 22 48.51	+2.06	−13 57 22.9	− 4.6	Camb., U. S., A. G. Zones.....	−58.97	+5 56.7	Seeing fair.
17	14 14 5.03	+2.04	−13 58 11.1	− 5.1	" " " "	−59.01	+5 57.2	Seeing poor; clouds interrupt.
18	14 19 26.29	+2.05	−13 39 2.7	− 4.8	" " " "	−58.43	+5 57.1	Seeing fair; moonlight.
						B. J. 1908.		
19	23 18 24.87	+2.55	− 9 54 2.0	+17.4	Camb., U. S., A. G. Zones.....	− 3.31	−0 18.5	
20	23 5 2.81	+2.60	−11 1 38.5	+17.2	" " " "	− 2.89	−0 17.2	
21	23 6 34.91	+2.60	−11 1 9.0	+17.2	" " " "	− 3.05	−0 17.6	

(27) EUTERPE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 12	11 32 16	+1 31.98	−4 4.3	23 36 7.52	−5 32 50.8	8.900_n	0.787	1	30, 6	Hd.	12-inch
13	10 22 26	+2 33.60	−0 38.1	23 35 14.14	−5 38 54.8	9.308_n	0.784	2	30, 6	Hd.	" "
14	10 1 46	+1 38.04	−6 54.5	23 34 18.59	−5 45 11.2	9.364_n	0.783	3	29, 6	Hd.	" "
15	9 10 6	−1 4.01	+8 9.2	23 33 23.95	−5 51 16.8	9.488_n	0.777	4	30, 6	Hd.	" "
18	10 1 54	−0 21.43	−0 11.6	23 30 30.78	−6 10 23.2	9.293_n	0.788	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 34 32.02	+3.52	−5 29 10.5	+24.0	Straszburg, A. G. 8110.....	....	.. ....	Seeing fair.
2	23 32 37.02	+3.52	−5 38 40.8	+24.1	Wien-Ottakring, A. G. 8358.....	....	.. ....	Seeing quite unst.

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(27) EUTERPE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
3	23 32 37.02	+3.53	−5 38 40.8	+24.1	Wien-Ottakring, A. G. 8358.....	....	.. ....	Seeing fine.
4	23 34 24.43	+3.53	−5 59 50.1	+24.1	" " " 8365.....	....	.. ....	Seeing good.
5	23 30 48.66	+3.55	−6 10 35.9	+24.3	" " " 8353.....	....	.. ....	Seeing unst.

(28) BELLONA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 17	11 56 36	−0 34.67	+ 0 47.4	5 9 25.00	+ 8 57 23.7	8.840	0.641	1	15,3	F.	9.6-inch
19	11 4 20	−2 21.63	+ 4 16.7	5 7 38.05	+ 9 0 52.9	8.227_n	0.639	2	20,4	F.	" "
1903											
Nov. 10	11 7 53	+0 6.47	+10 18.9	3 6 4.28	+ 2 7 25.3	8.917_n	0.720	3	30,6	Hd.	12-inch
14	10 49 50	+2 1.75	+ 0 47.7	3 2 36.92	+ 1 51 45.9	8.906_n	0.722	4	30,6	Hd.	" "
14	11 12 13	+1 26.18	− 7 17.8	3 2 36.04	+ 1 51 39.7	8.556_n	0.722	5	30,6	Hd.	" "
15	10 26 18	+0 3.93	+ 5 42.6	3 1 46.00	+ 1 48 16.2	9.068_n	0.723	6	35,7	Hd.	" "
19	11 37 17	−1 21.99	+ 6 30.1	2 58 19.10	+ 1 35 45.7	8.791	0.725	7	30,6	Hd.	" "
1905											
Mar. 25	12 57 27	+1 28.22	+ 6 56.7	12 18 8.69	+ 8 27 36.9	9.012	0.649	8	30,6	Fn.	12-inch
25	13 22 32	−3 37.24	+ 2 45.6	12 18 7.61	+ 8 27 47.7	9.180	0.652	9	25,5	Fn.	" "
27	11 47 56	−1 1.44	+ 8 36.7	12 16 40.30	+ 8 43 6.0	8.258_n	0.643	10	30,6	Fn.	" "
27	12 25 17	+3 0.29	+ 7 48.7	12 16 39.02	+ 8 43 12.3	8.759	0.644	11	20,4	Fn.	" "
27	12 49 41	−1 18.00	− 4 21.4	12 16 38.16	+ 8 43 23.2	9.025	0.646	12	18,4	Fn.	" "
28	11 26 35	−3 6.93	− 1 30.6	12 15 55.59	+ 8 50 35.3	8.714_n	0.642	13	25,5	Fn.	" "
30	12 47 20	+0 43.76	− 6 50.5	12 14 24.34	+ 9 5 47.8	9.110	0.642	14	26,6	Fn.	" "
30	13 16 19	−0 49.54	+ 0 22.8	12 14 23.13	+ 9 6 0.5	9.265	0.647	15	26,6	Fn.	" "
1906											
June 28	11 26 46	+3 3.33	+ 3 28.2	18 27 49.10	−12 57 2.8	8.861_n	0.837	16	30,6	Fn.	26-inch
29	12 52 1	−0 40.04	+ 8 6.7	18 26 53.84	−12 59 27.7	9.045	0.836	17	17,6	R.	12-inch
29	13 43 48	−2 8.21	+ 8 30.8	18 26 51.94	−12 59 33.2	9.323	0.828	18	24,5	R.	" "
July 12	11 37 30	−1 58.10	+ 3 29.4	18 16 2.63	−13 34 51.6	8.934	0.840	19	25,5	R.	" "
12	12 9 12	−2 31.26	− 0 48.3	18 16 1.56	−13 34 58.1	9.173	0.837	20	20,4	R.	" "
12	12 49 23	−2 45.17	− 3 34.5	18 16 0.11	−13 35 2.8	9.352	0.830	21	20,4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						A. N. 3331.		
	h m s	s	° ′ ″	″		m s	′ ″	
1	5 9 55.11	+4.56	+8 56 22.6	+13.7	Leipzig II, A. G. 2087.....	−0 0.41	+ 0 4.7	Reading of micrometer decreased by 1 rev.
2	5 9 55.11	+4.57	+8 56 22.6	+13.6	" " " 2087.....	−0 0.67	+ 0 1.9	
						B. J. 1905.		
3	3 5 53.81	+4.00	+1 56 55.7	+10.7	Albany, A. G. 914.....	+6 44.97	+25 15.5	Seeing growing very unst.
4	3 0 31.15	+4.02	+1 50 47.4	+10.8	" " 879.....	+6 43.58	+25 2.4	Seeing fair; somewhat unst.
5	3 1 5.84	+4.02	+1 58 46.7	+10.8	" " 881.....	+6 43.53	+24 59.5	Seeing fair; somewhat unst.
6	3 1 38.05	+4.02	+1 42 23.0	+10.6	" " 889.....	+6 43.02	+24 56.8	Seeing good.
7	2 59 37.05	+4.04	+1 29 5.2	+10.4	" " 871.....	+6 39.75	+24 36.8	Seeing good.

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(28) BELLONA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1907. s	′ ″	
8	12 16 38.99	+1.48	+ 8 20 49.5	−9.3	Leipzig II, A. G. 6095.....	+3.22	−0 7.5	Seeing excellent.
9	12 21 43.37	+1.48	+ 8 25 11.3	−9.2	" " " 6120.....	+2.96	−0 5.0	Seeing excellent.
10	12 17 40.25	+1.49	+ 8 34 38.6	−9.3	" " " 6100.....	+3.14	−0 3.1	Seeing poor.
11	12 13 37.24	+1.49	+ 8 35 33.0	−9.4	" " " 6074.....	+3.08	−0 8.9	Seeing improving.
12	12 17 54.67	+1.49	+ 8 47 53.9	−9.3	" " " 6104.....	+3.01	−0 5.9	Seeing fair.
13	12 19 1.02	+1.50	+ 8 52 15.1	−9.2	" " " 6108.....	+2.76	−0 7.5	Seeing poor.
14	12 13 39.08	+1.50	+ 9 12 47.6	−9.3	" " " 6075.....	+3.29	−0 10.7	Seeing good.
15	12 15 11.17	+1.50	+ 9 5 46.9	−9.2	" " " 6087.....	+3.01	−0 6.7	Seeing good.
						B. J. 1908.		
16	18 24 43.56	+2.21	−13 0 39.2	+8.2	Camb., U. S., A. G. Zones.....	+8.99	−0 5.3	Comp. star had a s. pr. component.
17	18 27 31.66	+2.22	−13 7 42.8	+8.4	" " " "	+9.08	−0 3.8	Seeing good.
18	18 28 57.93	+2.22	−13 8 12.4	+8.4	" " " "	+9.12	−0 4.2	Seeing good.
19	18 17 58.41	+2.32	−13 38 29.6	+8.6	" " " "	+8.99	−0 6.2	Seeing good; sky thick.
20	18 18 30.50	+2.32	−13 34 18.4	+8.6	" " " "	+8.98	−0 8.6	Seeing steady; hazy.
21	18 18 42.96	+2.32	−13 31 36.9	+8.6	" " " "	+8.87	−0 8.2	Seeing good; hazy; good obs'n.

(29) AMPHITRITE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 26	11 39 25	+0 10.07	− 1 18.8	13 1 32.62	− 9 33 25.7	9.134_n	0.814	1	30, 6	Hd.	12-inch
Apr. 4	10 35 14	+0 43.67	+10 32.0	12 53 11.06	− 9 3 41.0	9.243_n	0.808	2	30, 6	Hd.	" "
4	11 9 41	−3 29.94	+ 3 41.9	12 53 9.59	− 9 3 38.4	9.036_n	0.811	3	20, 4	Hd.	" "
5	10 45 24	+2 52.93	+ 0 51.6	12 52 13.82	− 9 0 5.4	9.166_n	0.809	4	25, 5	Hd.	" "
8	9 54 42	+0 5.41	+11 46.0	12 49 26.31	− 8 49 10.4	9.330_n	0.804	5	30, 6	Hd.	" "
1905											
Nov. 23	13 25 12	−2 48.78	− 1 7.6	4 0 35.56	+30 22 24.8	9.328	0.196	6	25, 5	Fn.	12-inch
23	13 50 57	−3 50.32	− 1 37.1	4 0 34.22	+30 22 22.7	9.425	0.242	7	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 3849. s	′ ″	
1	13 1 20.17	+2.38	− 9 31 55.2	−11.7	Wien-Ottakring, A. G. 4717.....	−6.05	+0 44.4	
2	12 52 24.95	+2.44	− 9 14 0.2	−12.8	" " " 4684.....	−6.25	+0 49.4	
3	12 56 37.09	+2.44	− 9 7 7.8	−12.5	" " " 4699.....	−6.33	+0 46.9	
4	12 49 18.45	+2.44	− 9 0 44.0	−13.0	Newcomb's Fund. Cat. 815.....	−6.30	+0 47.5	
5	12 49 18.45	+2.45	− 9 0 44.0	−12.4	" " " 815.....	−6.20	+0 50.2	
6	4 3 20.11	+4.23	+30 23 28.9	+ 3.5	½ (Camb., Eng., A. G. 2002+ Leiden, A. G. 1568).	....	.. ....	Seeing good.
7	4 4 20.31	+4.23	+30 23 56.4	+ 3.4	½ (Camb., Eng., A. G. 2005+ Leiden, A. G. 1578).	....	.. ....	Seeing good.

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(30) URANIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 5	10 15 22	+1 49.33	−6 47.9	13 35 39.81	−13 25 57.7	9.442$_n$	0.822	1	29, 6	Hd.	12-inch
14	12 14 33	−1 2.42	+2 34.1	13 27 0.11	−12 39 30.6	8.596	0.836	2	30, 6	Hd.	" "
16	11 4 57	+2 42.20	−0 17.2	13 25 7.69	−12 28 54.4	8.918$_n$	0.834	3	30, 6	Hd.	" "
16	11 33 21	+3 28.16	+2 43.5	13 25 6.44	−12 28 47.7	8.397$_n$	0.836	4	28, 6	Hd.	" "
19	11 35 58	+0 34.17	+0 24.3	13 22 15.16	−12 12 14.4	8.017	0.834	5	30, 6	Hd.	" "
1905											
Aug. 3	12 40 1	+1 54.80	+0 39.7	21 43 7.06	−13 1 12.8	8.475$_n$	0.839	6	25, 5	R.	12-inch
3	13 2 14	+2 25.23	−3 32.6	21 43 6.31	−13 1 17.6	8.197	0.839	7	25, 5	R.	" "
18	12 7 8	+1 13.11	−2 15.9	21 28 44.02	−13 53 23.3	8.726	0.843	8	20, 4	R.	" "
18	12 23 34	+1 4.19	−0 58.1	21 28 43.38	−13 53 24.9	8.938	0.842	9	20, 4	R.	" "
18	12 41 33	−0 26.04	+0 35.5	21 28 42.61	−13 53 27.3	9.089	0.840	10	25, 5	R.	" "
21	11 17 3	+2 59.35	+2 35.3	21 25 51.10	−14 3 40.2	8.293$_n$	0.845	11	25, 5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O-C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	13 33 48.32	+2.16	−13 19 1.9	− 7.9	Camb., U. S., A. G. Zones.....	....	.. ....	Seeing good; est. mag. 10.5.
2	13 28 0.32	+2.21	−12 41 55.9	− 8.8	" " " "	....	.. ....	Seeing fair.
3	13 22 23.28	+2.21	−12 28 28.0	− 9.2	" " " "	....	.. ....	Seeing unsteady.
4	13 21 36.07	+2.21	−12 31 22.0	− 9.2	" " " "	....	.. ....	Seeing good.
5	13 21 38.77	+2.22	−12 12 29.4	− 9.3	Newcomb's Fund. Cat. 844.....	....	.. ....	Seeing fair.
6	21 41 9.63	+2.63	−13 2 10.9	+18.4	Camb., U. S., A. G. Zones.....	....	.. ....	Seeing fine; good obs'n.
7	21 40 38.45	+2.63	−12 58 3.4	+18.4	" " " "	....	.. ....	Seeing fine; good obs'n.
8	21 27 28.12	+2.79	−13 51 26.1	+18.7	½ (Camb., U. S., A. G. Zones+ Washington, A. G. 8102).	....	.. ....	Seeing good.
9	21 27 36.40	+2.79	−13 52 45.5	+18.7	½ (Camb., U. S., A. G. Zones+ Washington, A. G. 8103).	....	.. ....	Seeing good.
10	21 29 5.86	+2.79	−13 54 21.6	+18.8	½ (Camb., U. S., A. G. Zones+ Washington, A. G. 8112).	....	.. ....	Seeing good; ast. occulted a star during obs'n.
11	21 22 48.95	+2.80	−14 6 34.2	+18.7	Washington, A. G. 8078.....	....	.. ....	Seeing good.

(31) EUPHROSYNE=[1907 ZB].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 24	11 23 9	−1 17.17	− 4 19.1	13 41 11.67	−8 6 37.6	8.299$_n$	0.807	1	30, 6	Hd.	26-inch
25	10 34 0	+0 55.05	− 6 9.7	13 40 15.65	−8 7 28.9	9.035$_n$	0.805	2	30, 6	Hd.	" "
30	10 45 43	−1 12.90	+ 1 48.5	13 35 32.13	−8 12 18.9	8.561$_n$	0.807	3	15, 3	Fn.	" "
May 4	8 45 33	+0 52.62	−10 18.1	13 32 0.63	−8 16 42.8	9.361$_n$	0.799	4	30, 6	Fn.	" "
9	9 38 50	−2 38.03	+ 2 17.5	13 27 46.13	−8 23 20.2	8.924$_n$	0.808	5	25, 5	Hd.	" "
12	10 28 33	+0 54.29	− 9 33.4	13 25 23.92	−8 27 55.7	8.649	0.809	6	30, 6	Hd.	" "
17	8 54 4	−0 45.03	+ 6 8.9	13 21 53.25	−8 36 32.4	8.995$_n$	0.809	7	25, 5	Hd.	" "
21	9 39 32	+1 26.92	+ 5 14.2	13 19 21.36	−8 44 41.5	8.466	0.811	8	25, 5	Fn.	" "
27	9 12 2	−2 22.12	− 3 25.3	13 16 11.71	−8 58 44.5	8.443	0.813	9	25, 5	Hd.	" "
June 5	10 24 19	−1 56.66	− 6 24.0	13 12 48.46	−9 24 40.9	9.381	0.805	10	5, 1	Hd.	" "
6	10 18 4	−1 45.83	+ 4 26.4	13 12 32.36	−9 27 52.5	9.375	0.806	11	30, 6	Fn.	" "
6	10 18 13	−1 48.76	+ 1 15.3	13 12 32.42	−9 27 52.1	9.375	0.806	12	30, 6	Fn.	" "

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(31) EUPHROSYNE=[1907 ZB]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	13 42 27.58	+1.26	−8 2 13.3	−5.2	Wien-Ottakring, A. G. 4913.....	.....	.. ....	Seeing unst.; est. mag. 11.0.
2	13 39 19.34	+1.26	−8 1 13.9	−5.3	" " " 4900.....	....	.. ....	
3	13 36 43.75	+1.28	−8 14 2.1	−5.3	Newcomb's Fund. Cat. 859.....	....	.. ....	Clouds interrupt.
4	13 31 6.74	+1.27	−8 6 19.1	−5.6	Wien-Ottakring, A. G. 4849.....	....	.. ....	
5	13 30 22.89	+1.27	−8 25 32.2	−5.5	" " " 4844.....	....	.. ....	Seeing good, but hazy; est. mag. 11.5.
6	13 24 28.38	+1.25	−8 18 16.7	−5.6	" " " 4812.....	....	.. ....	Seeing unst.; est. mag. 11.5.
7	13 22 37.04	+1.24	−8 42 35.6	−5.7	" " " 4806.....	....	.. ....	Est. mag. 11.5.
8	13 17 53.23	+1.21	−8 49 49.9	−5.8	" " " 4787.....	....	.. ....	
9	13 18 32.64	+1.19	−8 55 13.7	−5.5	" " " 4790.....	....	.. ....	Seeing very bad; unst. and diffuse.
10	13 14 44.00	+1.12	−9 18 11.4	−5.5	" " " 4773.....	....	.. ....	Clouds interrupt.
11	13 14 17.08	+1.11	−9 32 13.4	−5.5	" " " 4769.....	....	.. ....	
12	13 14 20.07	+1.11	−9 29 1.9	−5.5	" " " 4771.....	....	.. ....	Est. mag. 11.0.

(32) POMONA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 11	12 16 31	+1 22.42	+2 14.9	2 40 41.77	+14 56 47.3	9.084	0.557	1	30, 6	D.	26-inch
11	12 30 16	−1 15.24	+2 20.7	2 40 41.20	+14 56 44.3	9.172	0.560	2	30, 6	D.	" "
14	9 20 15	−0 46.83	−0 26.1	2 38 9.84	+14 39 37.7	9.312_n	0.575	3	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	2 39 15.43	+3.92	+14 54 20.5	+11.9	Leipzig I, A. G. 801	....	.. ....	Seeing steadier.
2	2 41 52.51	+3.93	+14 54 12.0	+11.6	Veröff., Bonn. No. 10, 1173.....	....	.. ....	The δ of Leipzig I, A. G. 815, is wrong by 6′.
3	2 38 52.74	+3.93	+14 39 51.8	+12.0	Leipzig I, A. G. 800	....	.. ....	

(33) POLYHYMNIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 6	12 19 30	+0 11.11	−2 5.7	12 2 50.90	−0 7 15.6	9.197	0.741	1	5, 3	Br.	26-inch
7	9 27 47	+0 18.67	−0 8.8	12 2 13.19	−0 3 28.5	9.229_n	0.741	2	6, 6	Br.	" "
7	11 45 15	+0 14.04	+0 10.6	12 2 8.55	−0 3 9.0	9.003	0.741	3	24, 5	F.	12-inch

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(33) POLYHYMNIA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 8	10 27 18	−0 25.66	+4 16.8	12 1 28.85	+ 0 0 57.2	8.654$_n$	0.740	4	6, 4	Br. Hill	26-inch
8	11 12 23	−0 26.85	+4 26.4	12 1 27.66	+ 0 1 6.8	8.653	0.740	5	18, 4	F.	12-inch
13	10 53 48	−1 26.50	+0 18.8	11 58 5.04	+ 0 21 14.0	8.730	0.737	6	18, 4	Br.	26-inch
1898											
Dec. 14	11 8 48	−1 16.42	−7 7.1	5 23 56.30	+26 6 11.5	8.944$_n$	0.294	7	5, 1	F.	12-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1898. s	′ ″	
1	12 2 37.30	+2.49	− 0 4 53.6	−16.3	Microm. comp. with Nicol., A. G. 3357. {+0^m 45^s.27 · −1′ 50″.2 ..	+0.05	+0 1.5	
2	12 1 52.03	+2.49	− 0 3 3.4	−16.3	Nicolajew, A. G. 3357.....	+0.02	+0 1.5	
3	12 1 52.03	+2.48	− 0 3 3.4	−16.2	" " 3357.....	−0.45	−0 3.5	
4	12 1 52.03	+2.48	− 0 3 3.4	−16.2	" " 3357.....	+0.29	+0 2.0	
5	12 1 52.03	+2.48	− 0 3 3.4	−16.2	" " 3357.....	+0.06	+0 3.7	
6	11 59 29.09	+2.45	+ 0 21 11.1	−15.9	Bonn VI, +0°2888.....	....	.. ....	
						B. J. 1900.		
7	5 25 6.41	+6.31	+26 13 12.5	+ 6.1	Camb., Eng., A. G. 2488.....	−2.66	−0 1.2	

(37) FIDES.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 17	11 17 8	−3 47.57	−4 29.2	9 4 22.21	+21 36 0.4	9.399$_n$	0.468	1	25, 5	Hd.	12-inch
19	10 23 56	−0 38.29	−2 59.4	9 2 32.53	+21 43 9.3	9.514$_n$	0.506	2	29, 6	Hd.	" "
24	9 50 17	+0 24.91	+7 12.0	8 57 40.54	+22 0 47.1	9.533$_n$	0.511	3	30, 6	Hd.	" "
30	9 1 18	+0 2.76	+6 35.8	8 51 36.90	+22 20 6.4	9.570$_n$	0.527	4	30, 6	Hd.	" "
Feb. 1	10 3 0	+2 13.66	+4 12.6	8 49 31.87	+22 26 3.8	9.403$_n$	0.452	5	30, 6	Hd.	" "
3	10 18 16	−1 17.39	−3 4.6	8 47 30.10	+22 31 32.5	9.311$_n$	0.429	6	30, 6	Hd.	" "
6	9 57 6	+1 6.76	+3 7.5	8 44 32.40	+22 38 55.2	9.337$_n$	0.432	7	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1906. s	′ ″	
1	9 8 8.38	+1.40	+21 40 43.5	−13.9	Berlin B, A. G. 3689.....	+0.95	+0 1.1	Seeing a trifle unst.; est. mag. 9.2.
2	9 3 9.37	+1.45	+21 46 22.6	−13.9	" " " 3666.....	+0.93	+0 1.5	Seeing good.
3	8 57 14.09	+1.54	+21 53 49.0	−13.9	" " " 3634.....	+1.01	+0 1.5	Seeing poor.
4	8 51 32.52	+1.62	+22 13 44.6	−14.0	" " " 3603.....	+1.11	+0 3.1	Seeing fair.
5	8 47 16.56	+1.65	+22 22 5.1	−13.9	" " " 3574.....	+1.00	+0 3.3	Seeing poor; fuzzy.
6	8 48 45.83	+1.66	+22 34 50.9	−13.8	" " " 3583.....	+1.08	+0 3.8	Seeing poor.
7	8 43 23.96	+1.68	+22 36 1.3	−13.6	" " " 3553.....	+0.95	+0 4.8	Seeing fair.

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(39) LAETITIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 2	9 39 40	+1 6.62	−4 57.0	15 42 34.73	−3 50 24.5	9.202_n	0.772	1	30, 6	Hd.	12-inch
3	9 24 5	+0 20.66	−3 31.3	15 41 48.77	−3 48 58.8	9.254_n	0.771	2	30, 6	Hd.	" "
8	9 39 42	−0 17.06	−6 24.3	15 38 6.04	−3 44 13.3	9.023_n	0.772	3	30, 6	Hd.	" "
8	10 1 44	−3 22.83	+1 13.5	15 38 5.30	−3 44 13.3	8.792_n	0.773	4	25, 5	Hd.	" "
14	11 34 26	+0 48.95	+1 0.1	15 34 3.89	−3 43 45.5	9.242	0.771	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	15 41 25.27	+2.84	−3 45 26.7	−0.8	U. S. Naval Obs. transit circle position.	....	.. ....	
2	15 41 25.27	+2.84	−3 45 26.7	−0.8	U. S. Naval Obs. transit circle position.	....	.. ....	
3	15 38 20.25	+2.85	−3 37 48.7	−0.3	U. S. Naval Obs. transit circle position.	....	.. ....	
4	15 41 25.27	+2.86	−3 45 26.7	−0.1	U. S. Naval Obs. transit circle position.	....	.. ....	
5	15 33 12.10	+2.84	−3 44 45.4	−0.2	U. S. Naval Obs. transit circle position.	....	.. ....	

(40) HARMONIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 7	10 50 17	+0 46.28	−1 34.7	14 47 6.05	−10 10 49.8	9.040_n	0.819	1	30, 6	Hd.	12-inch
8	10 29 48	+3 15.71	−1 48.4	14 46 5.65	−10 7 47.2	9.146_n	0.817	2	30, 6	Hd.	" "
11	12 20 8	−2 37.43	+1 40.5	14 42 58.39	−9 58 46.2	9.046	0.818	3	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	14 46 17.41	+2.36	−10 9 10.8	−4.3	Wien-Ottakring, A. G. 5215.....	....	.. ....	Seeing good; est. mag. 9 0.
2	14 42 47.58	+2.36	−10 5 54.3	−4.5	" " " 5191.....	....	.. ....	Seeing good.
3	14 45 33.44	+2.38	−10 0 22.5	−4.2	" " " 5209.....	....	.. ....	Seeing unst.

(42) ISIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1902	h m s	m s	′ ″	h m s	° ′ ″						
July 2	13 2 50	+1 36.01	−1 10.9	20 16 9.10	−27 30 11.7	8.855_n	0.904	1	6, 8	K.	12-inch

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(42) ISIS—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 17	10 3 8	+1 2.60	−0 41.3	7 1 15.82	+25 38 1.9	9.583_n	0.479	2	30, 6	D.	26-inch
17	10 20 52	−0 37.34	+2 15.5	7 1 15.13	+25 38 5.3	9.551_n	0.454	3	29, 6	D.	" "
1904											
Jan. 5	12 10 30	+0 18.74	+0 12.9	6 40 8.39	+26 53 25.4	8.794	0.262	4	29, 6	D.	26-inch
1905											
Mar. 28	10 37 24	−2 9.74	−1 1.8	12 5 4.30	+13 47 8.9	9.114_n	0.576	5	25, 5	Hd.	26-inch
30	11 25 20	+2 50.49	−3 32.8	12 3 10.12	+13 56 25.2	8.112_n	0.566	6	25, 5	Hd.	" "
30	11 38 54	+0 23.30	−6 7.3	12 3 9.69	+13 56 28.1	8.177	0.566	7	18, 6	Hd.	" "
Apr. 7	10 30 31	+2 53.50	−7 37.8	11 56 4.00	+14 26 5.0	8.668_n	0.559	8	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	20 14 29.34	+3.75	−27 29 20.6	+19.8	Cordoba Gen. Cat. 27849.....	.....	.. ....	Seeing excellent.
2	7 0 8.29	+4.93	+25 39 0.1	−16.9	Camb., Eng., A. G. 3736.....	+15.91	+0 11.3	Seeing very unst.
3	7 1 47.55	+4.92	+25 36 6.9	−17.1	" " " 3749.....	+15.99	+0 11.4	Seeing unst.
4	6 39 48.05	+1.60	+26 53 23.5	−11.0	" " " 3478.....	+16.23	+0 19.4	
						B. J. 1907.		
5	12 7 12.58	+1.46	+13 48 19.9	− 9.2	Leipzig I, A. G. 4508.....	+11.57	−0 56.6	
6	12 0 18.17	+1.46	+14 0 7.2	− 9.2	" " " 4481.....	+11.15	−1 11.0	Seeing excellent.
7	12 2 44.93	+1.46	+14 2 44.5	− 9.1	" " " 4492.....	+11.27	−1 10.6	Seeing excellent.
8	11 53 9.06	+1.44	+14 33 51.2	− 8.4	½ (Leip. I, A. G. 4452+Ber. A, A. G. 4573).	+11.15	−1 16.7	

(43) ARIADNE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 18	10 41 5	−2 15.62	+1 24.9	16 48 44.74	−22 58 18.9	8.694_n	0.888	1	30, 6	Hd.	12-inch
21	9 23 22	+0 0.30	+0 40.7	16 46 15.71	−22 43 54.4	9.262_n	0.877	2	20, 8	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	16 50 56.92	+3.44	−22 59 47.4	+3.6	Cape 1885, 1184.....	....	.. ....	
2	16 46 11.96	+3.45	−22 44 38.3	+3.2	Radcliffe 1890, 4380.....	....	.. ....	

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(44) NYSA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 13	10 39 26	+2 20.48	+3 8.5	4 7 40.25	+15 2 21.6	7.437	0.548	1	30, 6	Hd.	12-inch
13	11 3 11	−2 44.24	−7 21.1	4 7 39.15	+15 2 20.2	8.715	0.549	2	30, 6	Hd.	" "
16	10 9 46	+2 46.67	+7 44.6	4 5 6.53	+15 2 10.0	8.462_n	0.548	3	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 5 15.52	+4.25	+14 59 10.2	+2.9	½ (Leip. I, A. G. 1223+Ber. A, A. G. 1101).	....	.. ....	Seeing fair; est. mag. 9.0.
2	4 10 19.12	+4.27	+15 9 38.9	+2.4	½ (Leip. I, A. G. 1247+Ber. A, A. G. 1118).	....	.. ....	Seeing fair.
3	4 2 15.61	+4.25	+14 54 22.3	+3.1	Leipzig I, A. G. 1207.....	....	.. ....	Seeing fine; star double; used n. f. component.

(46) HESTIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 16	13 41 39	−4 3.41	+4 54.0	12 4 40.26	− 0 37 27.6	9.165	0.746	1	30, 6	D.	26-inch
Apr. 3	11 25 41	−2 29.29	+3 19.5	11 49 40.53	+ 1 12 39.8	8.684	0.729	2	30, 6	D.	" "
3	11 47 58	+0 42.40	+7 47.3	11 49 39.83	+ 1 12 44.5	8.965	0.729	3	30, 6	D.	" "
1905											
June 28	13 16 4	+1 13.33	+4 2.1	18 45 10.43	−19 2 40.8	9.080	0.867	4	25, 5	Fn.	12-inch
28	13 35 52	+1 6.44	−1 57.1	18 45 9.45	−19 2 41.5	9.205	0.864	5	22, 5	Fn.	" "
28	13 51 29	+0 24.87	+1 53.7	18 45 9.07	−19 2 39.3	9.281	0.860	6	23, 5	Fn.	" "
July 8	12 36 20	+2 0.80	−2 31.3	18 35 21.22	−19 13 37.1	9.144	0.866	7	20, 4	Fn.	" "
8	13 8 2	−1 4.97	−2 9.4	18 35 20.03	−19 13 40.4	9.306	0.860	8	24, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						B. J. 1906		
	h m s	s	° ′ ″	″		s	′ ″	
1	12 8 41.81	+1.86	− 0 42 9.8	−11.8	Nicolajew, A. G. 3376.....	−12.82	+1 17.6	Seeing fair.
2	11 52 7.93	+1.89	+ 1 9 32.9	−12.6	Albany, A. G. 4382.....	−12.53	+1 15.7	Seeing thick; fuzzy.
3	11 48 55.54	+1.89	+ 1 5 9.9	−12.7	" " 4369.....	−12.48	+1 15.1	Seeing very poor.
						B. J. 1907.		
4	18 43 54.51	+2.59	−19 6 54.3	+11.4	Algiers, A. G. Zones	−31.36	−0 34.1	Seeing good.
5	18 44 0.42	+2.59	−19 0 55.8	+11.4	" " "	−31.51	−0 34.1	Seeing good.
6	18 44 41.61	+2.59	−19 4 44.4	+11.4	" " "	−31.24	−0 31.3	Seeing good.
7	18 33 17.72	+2.70	−19 11 16.8	+11.0	" " "	−31.34	−0 25.3	Seeing good.
8	18 36 22.30	+2.70	−19 11 42.1	+11.1	" " "	−31.19	−0 27.0	Seeing good.

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(47) AGLAJA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
May 18	11 31 51	+3 56.66	− 2 25.3	14 28 56.69	−20 17 46.5	9.017	0.874	1	10, 2	F.	9.6-inch
1904											
Mar. 9	11 47 1	−3 35.48	+ 4 22.3	10 53 59.10	+ 9 45 30.6	7.751	0.629	2	29, 6	D.	26-inch
13	10 6 8	−2 10.47	−11 16.0	10 50 46.02	+ 9 59 36.2	9.197_n	0.633	3	30, 6	D.	" "
13	10 32 34	−2 27.88	−12 59.6	10 50 45.11	+ 9 59 38.4	9.026_n	0.629	4	30, 6	D.	" "
1906											
Oct. 7	10 46 35	+0 1.99	− 0 15.2	0 49 1.84	+ 6 45 53.2	9.068_n	0.670	5	6, 6	Hd.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	14 24 57.47	+2.56	−20 15 2.3	−18.9	Algiers, A. G. Zones.....	....	.. ....	
						B. J. 1906.		
2	10 57 32.82	+1.76	+ 9 41 22.0	−13.7	Leipzig II, A. G. 5666.....	+0.60	−0 5.5	
3	10 52 54.72	+1.77	+10 11 5.9	−13.7	Leipzig I, A. G. 4161.....	+0.54	−0 5.2	
4	10 53 11.22	+1.77	+10 12 51.7	−13.7	Leipzig I, A. G. 4162.....	+0.55	−0 6.9	
						B. J. 1908.		
5	0 48 57.06	+2.79	+ 6 45 52.2	+16.2	Leipzig II, A G. 306.....	+0.99	+0 9.5	Seeing fair.

(49) PALES.

[NOTE.—The identity of this asteroid in 1904 is uncertain.]

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 19	12 9 39	−2 18.72	−4 48.8	23 3 32.91	− 1 54 43.0	9.078_n	0.757	1	17, 4	F.	9.6-inch
1904											
Apr. 21	12 55 4	+3 56.51	+3 42.1	13 52 50.32	−16 3 18.4	9.102	0.852	2	29, 6	D.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″			B. J. 1897.	
1	23 5 48.10	+3.53	− 1 50 13.8	+19.6	½ (Nicolajew, A G. 5788+Strasz., A. G. 7991)	s +13.72	′ ″ +1 55.0	
2	13 48 51.48	+2.33	−16 6 48.1	−12.4	Washington, A. G. 5213.....	....	.. ....	Seeing unsteady.

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(52) EUROPA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

R.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	10 23 26.51	+0.84	+15 13 44.5	−6.9	Berlin A, A. G. 4162.....	....	.. ....	Est. mag. 11.0.
2	10 21 11.79	+0.85	+15 22 23.2	−6.8	" " " 4142.....	....	.. ....	
3	10 17 44.94	+0.87	+15 49 0.2	−6.5	" " " 4129.....	....	.. ....	Thick clouds; ast. very ft.

(53) KALYPSO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 20	11 40 33	−0 4.83	− 0 22.6	5 6 51.20	+13 48 2.1	9.257$_n$	0.583	1	34, 7	Hd.	12-inch
20	11 58 21	−0 37.81	− 0 15.7	5 6 50.58	+13 47 58.3	9.165$_n$	0.578	2	24, 8	Hd.	" "
22	11 31 32	+1 28.75	− 3 27.6	5 5 20.79	+13 44 8.7	9.255$_n$	0.584	3	30, 6	Hd.	" "
26	10 45 56	+0 25.88	− 6 20.3	5 2 5.90	+13 37 22.6	9.360$_n$	0.595	4	28, 6	Hd.	" "
Dec. 7	11 6 5	+1 30.98	− 2 0.1	4 51 59.72	+13 26 30.1	8.942$_n$	0.578	5	30, 6	Hd.	" "
7	11 23 58	+0 59.40	+ 4 51.0	4 51 59.17	+13 26 31.4	8.709$_n$	0.576	6	30, 6	Hd.	" "
11	10 44 4	+1 47.42	− 3 30.9	4 48 13.37	+13 25 56.6	8.967$_n$	0.578	7	30, 6	Hd.	" "
1905											
Apr. 24	10 55 16	+3 16.87	− 1 29.8	14 47 39.57	− 8 8 5.0	9.300$_n$	0.801	8	25, 5	Hd.	26-inch
May 1	11 0 1	+0 16.26	−11 23.7	14 41 28.62	− 7 35 16.0	9.103$_n$	0.801	9	18, 6	Hd.	" "
7	10 52 31	+1 50.46	− 1 35.2	14 36 11.60	− 7 9 47.3	8.928$_n$	0.799	10	25, 5	Hd.	" "
7	11 7 38	+0 57.41	− 3 5.4	14 36 11.24	− 7 9 48.0	8.737$_n$	0.800	11	25, 5	Hd.	" "
1907											
Oct. 25	9 30 33	+0 41.46	− 5 30.1	2 7 53.72	+ 4 3 56.1	9.430$_n$	0.707	12	25, 5	Hd.	26-inch
25	9 44 25	+0 42.34	+ 8 3.2	2 7 53.60	+ 4 3 53.3	9.392$_n$	0.705	13	25, 5	Hd.	" "
25	9 54 23	−0 3.40	+ 7 1.5	2 7 53.03	+ 4 3 49.8	9.360$_n$	0.704	14	25, 5	Hd.	" "
25	10 4 15	−1 3.11	− 2 22.0	2 7 52.51	+ 4 3 46.0	9.326$_n$	0.704	15	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	5 6 51.67	+4.36	+13 48 27.1	− 2.4	Leipzig I, A. G. 1550.....	+37.59	+1 31.0	Seeing good.
2	5 7 24.04	+4.35	+13 48 16.5	− 2.5	" " " 1555.....	+37.55	+1 28.6	Seeing good; ast. very ft.
3	5 3 47.64	+4.40	+13 47 38.5	− 2.2	" " " 1528.....	+38.37	+1 33.0	Seeing excellent; good obs'n.
4	5 1 35.56	+4.46	+13 43 44.9	− 2.0	" " " 1511.....	+39.73	+1 39.5	Seeing fair; ast. quite ft.
5	4 50 24.13	+4.61	+13 28 31.6	− 1.4	" " " 1423.....	+43.15	+1 50.9	Seeing fair.
6	4 50 55.17	+4.60	+13 21 41.8	− 1.4	" " " 1426.....	+43.35	+1 52.4	Seeing fair.
7	4 46 21.30	+4.65	+13 29 28.5	− 1.0	" " " 1397.....	+43.80	+1 54.3	Seeing fair.
						B. J. 1907.		
8	14 44 20.86	+1.84	− 8 6 31.9	− 3.3	Wien-Ottakring, A. G. 5198.....	+ 3.91	+0 12.3	Seeing poor.
9	14 41 10.46	+1.90	− 7 23 48.9	− 3.4	" " " 5182.....	+ 4.27	+0 11.5	
10	14 34 19.21	+1.93	− 7 8 8.6	− 3.5	" " " 5149.....	+ 3.74	+0 13.4	Seeing bad.
11	14 35 11.90	+1.93	− 7 6 39.2	− 3.4	" " " 5153.....	+ 3.95	+0 9.3	Seeing bad.
						B. J. 1909.		
12	2 7 9.52	+2.74	+ 4 9 12.7	+13.5	Albany, A. G. 614.....	+ 6.80	+0 29.3	Seeing rather poor.
13	2 7 8.53	+2.73	+ 3 55 36.6	+13.5	" " 613.....	+ 7.20	+0 30.0	Seeing rather poor.
14	2 7 53.69	+2.74	+ 3 56 34.9	+13.4	" " 618.....	+ 7.00	+0 29.0	Seeing rather poor.
15	2 8 52.88	+2.74	+ 4 5 54.6	+13.4	" " 624.....	+ 6.85	+0 27.7	Seeing rather poor.

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(56) MELETE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 2	10 59 0	+1 24.99	+1 18.3	22 21 50.09	−0 28 26.8	8.882$_n$	0.745	1	30, 6	Hd.	12-inch
3	10 28 48	+0 44.67	−8 18.7	22 21 9.77	−0 38 3.7	9.100$_n$	0.746	2	30, 6	Hd.	" "
4	10 22 23	−1 47.13	−0 0.3	22 20 29.28	−0 47 51.6	9.112$_n$	0.747	3	30, 6	Hd.	" "
10	10 36 2	−0 1.53	+4 32.9	22 16 40.79	−1 47 36.1	8.692$_n$	0.756	4	35, 8	Hd.	" "
11	9 24 21	+1 49.36	−4 1.2	22 16 7.71	−1 57 1.2	9.252$_n$	0.757	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	22 20 21.58	+3.52	−0 30 9.8	+24.7	Nicolajew, A.G. 5641	....	.. ....	Seeing good.
2	22 20 21.58	+3.52	−0 30 9.8	+24.8	" " 5641	....	.. ....	Seeing good.
3	22 22 12.89	+3.52	−0 48 16.1	+24.8	" " 5647	....	.. ....	Seeing good.
4	22 16 38.80	+3.52	−1 52 34.2	+25.2	Newcomb's Fund. Cat. 1473	....	.. ....	Seeing good.
5	22 14 14.83	+3.52	−1 53 25.1	+25.1	Nicolajew, A.G. 5619	....	.. ....	Seeing good.

(57) MNEMOSYNE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
July 18	10 45 9	−2 51.88	−0 52.4	19 51 38.13	+1 6 9.5	9.211$_n$	0.730	1	30, 6	Hd.	12-inch
21	10 55 4	+0 20.46	+2 35.5	19 49 23.66	+0 59 24.3	9.069$_n$	0.731	2	30, 6	Hd.	" "
22	10 1 30	−0 22.56	+0 7.1	19 48 40.65	+0 56 56.0	9.319$_n$	0.732	3	30, 6	Hd.	" "
24	10 17 10	−0 24.18	+5 38.4	19 47 11.05	+0 51 20.1	9.211$_n$	0.733	4	30, 6	Hd.	" "
25	10 56 26	+2 13.93	+2 59.2	19 46 25.28	+0 48 13.6	8.892$_n$	0.733	5	20, 4	Hd.	" "
1904											
Oct. 21	13 3 28	+1 17.97	−2 24.3	1 48 17.37	+7 33 21.8	9.177	0.662	6	30, 6	D.	26-inch
24	12 9 57	−0 29.69	−1 2.4	1 46 15.16	+7 5 15.7	8.862	0.665	7	30, 6	D.	" "
24	12 31 10	+2 32.92	−7 41.3	1 46 14.38	+7 4 57.9	9.060	0.666	8	30, 6	D.	" "
27	10 4 57	−0 40.97	−7 25.0	1 44 16.60	+6 37 45.4	9.171$_n$	0.673	9	35, 6	D.	" "
27	10 31 56	+2 48.64	+1 24.3	1 44 16.00	+6 37 32.0	8.982$_n$	0.671	10	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						B. J. 1905		
	h m s	s	° ′ ″	″		s	′ ″	
1	19 54 26.75	+3.26	+1 6 44.2	+17.7	Nicolajew, A.G. 5027	+27.29	+2 44.6	Star B.D. +0°4357 seems to be missing.
2	19 48 59.91	+3.29	+0 56 30.7	+18.1	" " 5006	+27.33	+2 45.6	
3	19 48 59.91	+3.30	+0 56 30.7	+18.2	" " 5006	+27.34	+2 45.6	
4	19 47 31.92	+3.31	+0 45 23.2	+18.5	Newcomb's Fund. Cat. 1288	+27.47	+2 47.5	
5	19 44 8.04	+3.31	+0 44 55.9	+18.5	Nicolajew, A.G. 4985	+27.34	+2 47.9	Very ft.; poor obs'n.
						B. J. 1906.		
6	1 46 55.84	+3.56	+7 35 30.2	+15.9	Leipzig II, A.G. 704	+37.78	+0 15.0	
7	1 46 41.29	+3.56	+7 6 2.3	+15.8	" " " 703	+37.55	+0 26.0	Perhaps an error of 1 rev.=9″.9 in δ.
8	1 43 37.90	+3.56	+7 12 23.2	+16.0	" " " 676	+37.39	+0 16.6	
9	1 44 54.00	+3.57	+6 44 54.5	+15.9	" " " 685	+37.37	+0 17.4	
10	1 41 23.79	+3.57	+6 35 51.6	+16.1	" " " 667	+37.55	+0 14.4	

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(58) CONCORDIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 19	11 20 14	+2 0.48	+7 14.3	8 25 22.26	+14 11 4.2	9.139$_n$	0.571	1	20, 4	F.	9.6-inch
26	10 8 50	+0 32.92	+0 40.6	8 18 59.68	+14 43 28.9	9.322$_n$	0.575	2	20, 4	F.	" "
1905											
June 25	11 37 2	+3 37.12	−4 17.2	16 34 56.74	−14 6 39.3	9.190	0.840	3	20, 4	Hd.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′	
1	8 23 19.98	+1.80	+14 3 48.6	+ 1.3	Bonn VI, +14°1901	....	....	
2	8 18 24.85	+1.91	+14 42 47.2	+ 1.1	Bonn VI, +14°1885	....	....	
						A. N. 4017.		
3	16 31 17.19	+2.43	−14 2 26.1	+ 4.0	Washington, A. G. 5980.....	+18	−0.2	Seeing poor.

(60) ECHO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 18	10 45 11	+1 22.18	−1 26.6	14 3 8.37	−10 27 36.3	9.266$_n$	0.816	1	28, 6	Hd.	12-inch
21	12 12 52	+2 25.08	−7 13.5	14 0 14.85	−10 7 18.2	8.261	0.821	2	29, 6	Hd.	" "
27	10 13 2	−1 47.52	−0 13.5	13 54 44.20	− 9 28 40.3	9.210$_n$	0.812	3	29, 6	Hd.	" "
29	11 15 39	+2 6.09	+1 12.6	13 52 53.36	− 9 15 45.3	8.282$_n$	0.815	4	30, 6	Hd.	" "
May 2	9 13 30	−0 6.69	+5 0.1	13 50 35.70	− 9 0 12.7	9.357$_n$	0.804	5	30, 8	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	14 1 43.57	+2.62	−10 26 0.6	−9.1	½ (München I, 9840+München II, 5181).	....	.. ....	Ft.; est. mag. 11.0.
2	13 57 47.18	+2.59	− 9 59 55.3	−9.4	Wien-Ottakring, A. G. 4985.....	....	.. ....	
3	13 56 29.11	+2.61	− 9 28 17.4	−9.4	" " " 4980.....	....	.. ....	Ast. very ft.
4	13 50 44.66	+2.61	− 9 16 48.1	−9.8	Radcliffe 1890, 3611.....	....	.. ....	
5	13 50 39.77	+2.62	− 9 5 2.9	−9.9	" " 3610.....	....	.. ....	

(61) DANÆ.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1897	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 23	13 20 6	−1 50.21	−10 25.7	5 55 29.68	+48 38 39.5	8.831$_n$	0.173$_n$	1	10, 2	F.	12-inch
27	8 43 48	−1 16.05	− 5 42.6	5 51 25.09	+48 46 40.0	9.813$_n$	0.263	2	15, 3	F.	" "

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(61) DANÆ—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1897	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 1	10 40 22	−0 55.64	− 7 38.7	5 46 41.41	+48 51 26.0	9.604_n	9.774_n	3	10, 2	F.	12-inch
12	8 58 43	−0 25.34	−15 54.4	5 32 56.59	+48 43 22.5	9.701_n	8.918	4	13, 4	F.	" "
15	10 6 47	−5 2.58	+10 46.1	5 29 0.30	+48 35 28.4	9.474_n	0.001_n	5	12, 3	F.	" "
30	10 22 31	+0 20.48	+11 11.0	5 11 17.81	+47 24 23.8	9.446_n	0.121_n	6	10, 2	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1899. s	′ ″	
1	5 57 12.67	+7.22	+48 49 4.4	+ 0.8	Bonn, A. G. 4964.....	−5.71	−0 0.8	
2	5 52 33.77	+7.37	+48 52 20.7	+ 1.9	" " 4887.....	−6.11	+0 5.1	
3	5 47 29.54	+7.51	+48 59 1.4	+ 3.3	" " 4818.....	−5.94	+0 3.2	
4	5 33 14.18	+7.75	+48 59 9.6	+ 7.3	" " 4637.....	−5.48	−0 3.0	
5	5 33 55.15	+7.73	+48 24 34.6	+ 7.7	" " 4645.....	−6.76	−0 10.1	
6	5 10 49.66	+7.67	+47 12 58.9	+13.9	" " 4315.....	−7.59	−0 19.2	

(63) AUSONIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 20	11 0 9	−0 50.11	+1 48.3	0 16 18.19	+ 6 15 46.1	9.200_n	0.678	1	30, 6	Hd.	12-inch
20	11 17 47	+0 25.62	+3 14.1	0 16 17.49	+ 6 15 43.7	9.096_n	0.676	2	30, 6	Hd.	" "
21	10 54 46	−0 33.24	−0 10.6	0 15 18.64	+ 6 12 19.1	9.203_n	0.679	3	25, 6	Hd.	" "
21	11 39 9	+2 27.44	−9 44.4	0 15 16.74	+ 6 12 11.9	8.864_n	0.675	4	30, 6	Hd.	" "
25	11 39 51	+2 30.22	−5 17.5	0 11 15.47	+ 5 57 33.9	8.510_n	0.677	5	30, 6	Hd.	" "
1907											
Oct. 30	10 51 1	−1 36.14	−9 37.4	2 22 22.16	+22 53 49.7	9.095_n	0.395	6	25, 5	Fn.	12-inch
Nov. 4	10 11 10	+0 8.44	+5 8.1	2 17 2.77	+22 32 16.6	9.191_n	0.412	7	19, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	0 17 4.64	+3.66	+ 6 13 35.3	+22.5	Leipzig II, A. G. 97.....	....	.. ....	Seeing unst.
2	0 15 48.21	+3.66	+ 6 12 7.1	+22.5	" " " 91.....	....	.. ....	Seeing unst.
3	0 15 48.21	+3.67	+ 6 12 7.1	+22.6	" " " 91.....	....	.. ....	Seeing unst.
4	0 12 45.63	+3.67	+ 6 21 33.6	+22.7	" " " 72.....	....	.. ....	Seeing very bad.
5	0 8 41.56	+3.69	+ 6 2 28.2	+23.2	" " " 43.....	....	.. ....	Seeing fair.
6	2 23 55.23	+3.07	+23 3 14.5	+12.6	Berlin B, A. G. 748.....	....	.. ....	Seeing good.
7	2 16 51.24	+3.09	+22 26 55.1	+13.4	" " " 714.....	....	.. ....	Seeing good.

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(64) ANGELINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 22	10 22 41	+0 42.91	− 3 12.4	2 53 41.62	+18 47 31.3	8.758$_n$	0.479	1	29, 6	Hd.	12-inch
25	11 39 54	+0 36.74	−10 55.3	2 51 2.09	+18 34 51.2	9.128	0.493	2	30, 6	Hd.	" "
27	9 40 42	+2 30.22	+ 7 29.1	2 49 26.63	+18 27 9.0	8.977$_n$	0.490	3	30, 6	Hd.	" "
30	8 59 24	+0 10.27	− 4 14.0	2 47 6.68	+18 15 25.8	9.176$_n$	0.502	4	25, 5	Hd.	" "
30	9 16 50	−1 17.79	+ 0 53.2	2 47 6.04	+18 15 20.0	9.060$_n$	0.496	5	29, 6	Hd.	" "
1905											
Apr. 1	10 40 51	−4 9.86	+ 2 29.6	12 22 37.31	− 4 29 23.0	9.091$_n$	0.778	6	19, 5	Fn.	12-inch
2	11 28 23	+0 46.86	− 3 48.4	12 21 45.52	− 4 24 3.1	8.301$_n$	0.779	7	30, 6	Fn.	" "
2	12 16 6	+3 19.78	+ 3 9.4	12 21 43.63	− 4 23 49.8	8.877	0.778	8	18, 4	Fn.	" "
7	14 20 16	+2 9.92	+ 1 14.6	12 17 35.67	− 3 57 53.0	9.522	0.764	9	19, 4	Fn.	" "
8	14 45 32	−0 11.94	− 1 9.6	12 16 48.08	− 3 52 49.2	9.569	0.760	10	21, 6	Fn.	" "
18	12 20 54	+2 41.85	− 0 53.5	12 9 58.73	− 3 8 5.0	9.351	0.765	11	20, 4	Fn.	26-inch
23	12 47 11	−4 10.36	− 6 50.3	12 7 15.42	− 2 49 19.4	9.482	0.759	12	25, 5	Fn.	12-inch
24	10 10 8	+0 47.98	− 9 33.7	12 6 50.30	− 2 46 28.7	8.420	0.765	13	30, 6	Fn.	" "
24	10 43 24	−1 37.32	+ 4 59.5	12 6 49.54	− 2 46 22.6	8.965	0.765	14	29, 6	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	2 52 54.19	+4.52	+18 50 31.3	+12.4	Berlin A, A. G. 796.....	....	.. ....	Seeing good.
2	2 50 20.83	+4.52	+18 45 33.7	+12.8	" " " 786.....	....	.. ....	Seeing good.
3	2 46 51.91	+4.50	+18 19 26.7	+13.2	" " " 772.....	....	.. ....	
4	2 46 51.91	+4.50	+18 19 26.7	+13.1	" " " 772.....	....	.. ....	Seeing good; ft. because of moonlight.
5	2 48 19.33	+4.50	+18 14 13.8	+13.0	" " " 778.....	....	.. ....	Seeing good; ft. because of moonlight.
6	12 26 45.54	+1.63	− 4 31 43.2	− 9.4	Straszburg, A. G. 4613.....	....	.. ....	
7	12 20 57.03	+1.63	− 4 20 5.1	− 9.6	" " 4584.....	....	.. ....	Seeing good.
8	12 18 22.22	+1.63	− 4 26 49.4	− 9.8	" " 4570.....	....	.. ....	Seeing good.
9	12 15 24.13	+1.62	− 3 58 57.8	− 9.8	" " 4557.....	....	.. ....	Seeing fair.
10	12 16 58.39	+1.63	− 3 51 29.8	− 9.8	" " 4562.....	....	.. ....	Seeing good.
11	12 7 15.30	+1.58	− 3 7 1.4	−10.1	" " 4525.....	....	.. ....	
12	12 11 24.21	+1.57	− 2 42 19.2	− 9.9	" " 4540.....	....	.. ....	Seeing poor; sky thick; moonlight.
13	12 6 0.77	+1.55	− 2 36 44.9	−10.1	" " 4518.....	....	.. ....	Seeing good.
14	12 8 25.30	+1.56	− 2 51 12.0	−10.1	" " 4529.....	....	.. ....	Seeing good.

(65) CYBELE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 21	11 24 21	−1 4.60	+3 49.6	7 34 12.77	+18 21 44.2	7.885$_n$	0.486	1	7, 2	F.	12-inch
28	9 41 22	−0 18.49	+6 33.1	7 29 10.35	+18 38 4.5	9.186$_n$	0.496	2	19, 4	F.	" "
1903											
Dec. 16	11 30 29	+0 5.60	−2 29.2	6 22 36.36	+19 2 43.3	9.184$_n$	0.488	3	10, 10	D.	26-inch
1904											
Jan. 5	10 39 54	−2 9.22	+2 48.3	6 7 4.23	+19 13 59.8	8.799$_n$	0.448	4	30, 6	D.	26-inch
1905											
Feb. 4	13 5 10	+3 26.53	−5 11.2	10 23 42.53	+ 9 10 43.6	9.598$_n$	0.637	5	30, 6	D.	26-inch
1906											
May 21	8 41 52	−0 8.60	−3 33.2	14 47 8.60	−11 8 48.5	9.399$_n$	0.814	6	25, 5	Hd.	26-inch
21	8 53 32	−1 57.67	+8 34.2	14 47 8.32	−11 8 46.2	9.362$_n$	0.816	7	25, 5	Hd.	" "
25	10 19 13	+2 33.04	+0 31.7	14 44 35.37	−10 58 2.6	8.460$_n$	0.826	8	25, 5	Fn.	" "

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(65) CYBELE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	7 35 14.58	+2.79	+18 17 57.6	− 3.0	Berlin A, A. G. 2966	....	.. ....	
2	7 29 26.04	+2.80	+18 31 34.0	− 2.6	" " " 2914	....	.. ....	
						B. J. 1905.		
3	6 22 25.95	+4.81	+19 5 24.7	−12.2	Berlin A, A. G. 2162	−12.98	+0 2.9	Seeing very unst.
4	6 9 11.89	+1.56	+19 11 21.9	−10.4	" " " 2014	−12.97	−0 1.5	Seeing steady but thick.
						B. J. 1907.		
5	10 20 14.83	+1.17	+ 9 16 5.6	−10.8	Leipzig II, A. G. 5470	− 9.02	+0 47.9	Seeing poor.
						B. J. 1908.		
6	14 47 15.46	+1.74	−11 5 12.7	− 2.6	Camb., U. S., A. G. Zones	−16.89	+1 12.9	Seeing fair.
7	14 49 4.24	+1.75	−11 17 17.9	− 2.5	" " " "	−16.85	+1 13.9	Seeing fair.
8	14 42 0.59	+1.74	−10 58 31.6	− 2.7	Paris 18203	−16.82	+1 10.4	Seeing poor.

(67) ASIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 13	11 43 46	−2 56.52	−6 36.0	23 38 50.49	+3 55 23.0	8.733_n	0.701	1	30, 6	Hd.	12-inch
15	9 53 53	+0 3.99	−1 51.1	23 37 19.92	+3 37 46.9	9.385_n	0.709	2	30, 6	Hd.	" "
15	10 14 22	+2 31.11	−0 33.3	23 37 19.17	+3 37 38.5	9.316_n	0.708	3	30, 6	Hd.	" "
18	11 0 42	+1 23.18	−3 27.6	23 34 56.01	+3 9 15.7	8.967_n	0.709	4	30, 6	Hd.	" "
18	11 18 27	+0 11.43	+5 31.1	23 34 55.20	+3 9 9.3	8.760_n	0.709	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 41 43.41	+3.60	+4 1 35.4	+23.6	Albany, A. G. 8155	....	.. ....	Seeing quite unst.
2	23 37 12.32	+3.61	+3 39 14.1	+23.9	" " 8142	....	.. ....	Seeing good.
3	23 34 44.45	+3.61	+3 37 47.8	+24.0	" " 8131	....	.. ....	Seeing good.
4	23 33 29.22	+3.61	+3 12 19.0	+24.3	" " 8127	....	.. ....	Seeing unst.
5	23 34 40.16	+3.61	+3 3 13.9	+24.3	" " 8130	....	.. ....	Seeing unst.

(68) LETO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1899	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 6	12 22 49	−2 54.44	+4 45.9	21 8 32.07	−31 4 55.6	8.581	0.916	1	10, 7	See	12-inch
6	13 1 16	−2 56.01	+4 41.1	21 8 30.50	−31 5 0.4	9.103	0.911	1	15, 8	See	" "

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(68) LETO—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 7	11 58 20	−3 39.74	− 0 14.7	21 7 46.77	−31 9 56.2	7.907_n	0.916	1	20, 13	See	12-inch.
8	10 34 5	−4 41.95	− 5 18.6	21 6 44.56	−31 15 0.1	9.278_n	0.905	1	20, 10	See	" "
16	12 45 30	−2 18.43	− 3 6.6	20 59 22.10	−31 30 43.8	9.302	0.904	2	20, 10	See	" "
24	10 33 15	+3 11.43	+18 7.2	20 52 59.42	−31 35 2.1	8.213_n	0.918	3	20, 8	See	" "
25	8 56 20	+2 31.26	+18 32.4	20 52 19.25	−31 34 36.9	9.354_n	0.900	3	20, 9	See	" "
1903											
May 9	10 51 7	+0 7.64	+ 0 7.4	15 32 44.76	−21 2 30.5	9.293_n	0.868	4	29, 6	Hd.	12-inch
13	10 21 49	+0 22.17	− 0 39.9	15 28 56.83	−20 59 48.0	9.333_n	0.866	5	30, 6	Hd.	" "
21	11 15 38	−1 36.61	+ 0 15.3	15 21 7.90	−20 52 5.6	8.371_n	0.879	6	30, 6	Hd.	" "
28	10 28 58	+1 22.04	+ 0 55.6	15 14 33.20	−20 44 5.8	8.701_n	0.878	7	30, 6	Hd.	" "
June 1	9 49 15	+0 46.39	− 4 33.2	15 11 1.68	−20 39 26.0	8.971_n	0.876	8	30, 6	Hd.	" "
1906											
Jan. 10	9 58 14	+2 29.32	+0 30.5	8 32 44.85	+30 20 55.2	9.601_n	0.392	9	25, 5	Hd.	26-inch
10	10 12 17	+0 18.58	+0 15.2	8 32 44.45	+30 20 57.1	9.576_n	0.364	10	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	21 11 21.49	+5.02	−31 10 2.1	+20.6	Cordoba Gen. Cat. 29190.....	....	.. ....	Est. mag. 9.5.
2	21 1 35.43	+5.10	−31 27 56.1	+18.9	" " " 28956.....	....	.. ....	
3	20 49 42.84	+5.15	−31 53 25.5	+16.2	" " " 28686.....	....	.. ....	
						B. J. 1905.		
4	15 32 34.12	+3.00	−21 2 35.4	− 2.5	Cincinnati 1885, 2632.....	+31.86	−3 9.8	
5	15 28 31.62	+3.04	−20 59 5.1	− 3.0	" " 2626.....	+31.97	−3 16.7	
6	15 22 41.40	+3.11	−20 52 17.1	− 3.8	" " 2613.....	+31.50	−3 19.2	
7	15 13 8.03	+3.13	−20 44 56.7	− 4.7	" " 2591.....	+30.95	−3 25.6	
8	15 10 12.16	+3.13	−20 34 47.7	− 5.1	" " 2586.....	+31.03	−3 30.9	
						B. J. 1908.		
9	8 30 14.85	+0.68	+30 20 34.6	− 9.9	Leiden, A. G. 3580.....	+ 9.90	−0 43.5	Seeing bad.
10	8 32 25.20	+0.67	+30 20 51.9	−10.0	" " 3592.....	+10.06	−0 44.4	Seeing bad.

(69) HESPERIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 2	10 29 7	+0 10.62	−5 17.0	15 40 45.98	−9 29 23.7	8.781_n	0.816	1	30, 6	Hd.	12-inch
3	10 8 2	−0 31.77	−2 45.8	15 40 3.59	−9 26 52.5	8.970_n	0.815	2	29, 6	Hd.	" "
14	10 11 29	+0 47.88	−9 28.2	15 32 59.84	−9 5 23.7	8.176	0.814	3	30, 6	Hd.	" "
15	10 37 57	+0 14.13	−8 9.2	15 32 26.09	−9 4 4.6	8.888	0.812	4	27, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	15 40 32.42	+2.94	−9 24 5.3	−1.4	Wien-Ottakring, A. G. 5494.....	....	.. ....	Ast. very ft.; poor obs'n.

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(69) HESPERIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
2	15 40 32.42	+2.94	−9 24 5.3	−1.4	Wien-Ottakring, A. G. 5494	....	.. ....	
3	15 32 9.02	+2.94	−8 55 54.3	−1.2	" " " 5457	....	.. ....	Very faint.
4	15 32 9.02	+2.94	−8 55 54.3	−1.1	" " " 5457	....	.. ....	

(71) NIOBE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 2	11 35 30	+0 43.65	−4 4.3	0 0 28.82	+26 1 12.0	9.314_n	0.340	1	18, 4	Br.	26-inch
3	10 2 49	−0 7.54	−1 23.9	23 59 37.64	+26 3 52.6	9.563_n	0.454	2	9, 5	Br.	" "
13	10 37 7	+0 6.33	+4 14.2	23 49 52.57	+26 19 10.9	9.334_n	0.338	3	8, 5	Br.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 59 40.83	+4.34	+26 4 52.0	+24.3	Camb., Eng., A. G. 14434	....	.. ....	Seeing fair; bright Moon.
2	23 59 40.83	+4.35	+26 4 52.0	+24.5	" " " 14434	....	.. ....	
3	23 49 41.78	+4.46	+26 14 29.8	+26.9	" " " 14342	....	.. ....	Ast. certainly 10.5 mag.

(72) FERONIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 20	10 3 21	+0 14.72	+1 39.7	0 57 22.84	+7 27 4.0	9.080_n	0.662	1	29, 6	K.	12-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	0 57 4.27	+3.85	+7 25 2.9	+21.4	Leipzig II, A. G. 364	....	.. ....	Seeing good.

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(76) FREIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
July 18	11 3 46	+1 53.21	−10 18.1	18 38 19.92	−20 34 48.3	8.454	0.878	1	12,3	F.	12-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1900.		
1	18 36 22.13	+4.58	−20 24 32.1	+1.9	Algiers, A. G. Zones.....	s −1.42	′ ″ +0 3.1	

(78) DIANA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 4	11 55 58	+1 50.04	−0 33.0	6 36 52.17	+36 6 22.5	8.585	9.614	1	25,5	Hd.	12-inch
4	12 10 58	−0 59.23	−5 41.3	6 36 51.34	+36 6 21.1	8.878	9.642	2	20,4	Hd.	" "
15	10 47 34	−1 8.64	−2 54.0	6 25 11.66	+35 18 42.0	7.703	9.720	3	30,6	Hd.	" "
15	11 8 16	−0 12.69	−6 43.0	6 25 10.80	+35 18 36.3	8.746	9.736	4	25,5	Hd.	" "
16	10 50 28	+1 12.00	−2 9.6	6 24 16.18	+35 13 10.9	8.380	9.734	5	30,6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	6 35 0.86	+1.27	+36 7 5.3	−9.8	Lund, A. G. 3438.....	....	.. ....	Seeing good.
2	6 37 49.30	+1.27	+36 12 12.3	−9.9	" " 3479.....	....	.. ....	Seeing good; clouds.
3	6 26 18.97	+1.33	+35 21 44.4	−8.4	" " 3358.....	....	.. ....	Seeing unst.
4	6 25 22.16	+1.33	+35 25 27.7	−8.4	" " 3346.....	....	.. ....	Seeing unst.
5	6 23 2.85	+1.33	+35 15 28.8	−8.3	" " 3324.....	....	.. ....	Seeing excellent; fine obs'n.

(79) EURYNOME.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 14	10 59 54	−0 2.04	+0 9.0	9 8 6.08	+8 28 48.1	9.451_n	0.666	1	20,4	F.	12-inch
21	10 45 20	+0 2.80	+9 44.1	9 1 39.83	+8 53 39.0	9.399_n	0.657	2	8,2	F.	" "

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(79) EURYNOME—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $\rho\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1901	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 20	10 44 52	+0 16.46	+ 6 33.5	22 9 14.30	− 3 59 17.8	9.240$_n$	0.773	3	10, 5	Hd.	12-inch
22	11 46 50	+4 19.23	−10 56.7	22 7 26.71	− 4 11 26.1	8.541$_n$	0.777	4	11, 6	Hd.	" "
Sept. 3	10 45 5	−0 43.27	+ 6 55.6	21 57 2.60	− 5 30 3.5	8.636$_n$	0.787	5	12, 12	Hd.	" "
4	10 28 39	+0 6.12	− 1 41.5	21 56 13.53	− 5 36 53.9	8.824$_n$	0.788	6	12, 12	Hd.	" "
7	9 20 7	−0 19.37	− 0 45.4	21 53 51.72	− 5 57 20.0	9.235$_n$	0.787	7	12, 12	Hd.	" "
9	10 21 38	+1 20.26	+ 6 7.5	21 52 18.33	− 6 11 22.9	8.527$_n$	0.793	8	28, 7	Hd.	" "
1903											
Feb. 19	9 56 18	−2 34.51	+ 1 24.4	10 20 31.87	+ 3 49 48.3	9.442$_n$	0.709	9	30, 6	Hd.	12-inch
20	9 58 41	−0 0.09	− 4 43.2	10 19 35.35	+ 3 56 25.1	9.424$_n$	0.708	10	29, 10	Hd.	" "
21	11 3 39	+0 24.96	− 4 53.1	10 18 36.27	+ 4 3 21.3	9.147$_n$	0.701	11	35, 8	Hd.	" "
22	10 13 10	+2 10.61	+ 3 29.8	10 17 41.84	+ 4 9 52.4	9.351$_n$	0.703	12	29, 6	Hd.	" "
1904											
May 15	11 27 21	−0 12.68	+ 2 54.8	16 12 45.91	−17 6 8.3	9.167$_n$	0.856	13	30, 6	Hd.	12-inch
21	11 28 54	+2 38.76	+ 5 51.7	16 7 3.25	−16 42 37.3	8.925$_n$	0.858	14	30, 6	Hd.	" "
23	11 53 3	+3 27.94	+ 6 16.5	16 5 6.30	−16 34 45.4	8.137$_n$	0.859	15	20, 4	Hd.	" "
1905											
Sept. 9	12 49 53	−1 42.06	+ 5 59.6	0 21 1.20	+ 6 48 47.0	8.526$_n$	0.667	16	23, 5	Fn.	12-inch
14	14 3 5	+1 49.14	+ 3 58.1	0 17 46.42	+ 6 17 2.8	9.195	0.678	17	24, 5	Fn.	" "
14	14 25 17	−2 16.87	− 5 45.3	0 17 45.48	+ 6 16 55.2	9.296	0.680	18	25, 5	Fn.	" "
14	14 53 12	+0 31.09	+ 2 15.6	0 17 44.80	+ 6 16 48.2	9.393	0.684	19	24, 5	Fn.	" "
24	11 0 40	+0 11.56	− 1 41.0	0 10 22.29	+ 5 2 18.1	9.049$_n$	0.690	20	20, 4	Fn.	" "
29	13 1 16	+3 2.84	− 4 47.8	0 6 19.65	+ 4 19 29.8	9.236	0.699	21	30, 6	Fn.	" "
29	13 40 56	+0 50.84	− 2 50.6	0 6 18.26	+ 4 19 13.8	9.386	0.703	22	27, 6	Fn.	" "
29	14 4 31	+1 11.91	+ 0 34.5	0 6 17.45	+ 4 19 6.0	9.450	0.705	23	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1901. s	′ ″	
1	9 8 5.58	+2.54	+ 8 28 48.9	− 9.8	Leipzig II, A. G. 5007.....	−2.28	−0 0.5	
2	9 1 34.37	+2.66	+ 8 44 5.3	−10.4	" " " 4962.....	−2.98	−0 4.2	
						B. J. 1903.		
3	22 8 53.74	+4.10	− 4 6 17.2	+25.9	U. S. Naval Obs. transit circle position.	−2.46	−0 17.5	
4	22 3 3.36	+4.12	− 4 0 55.4	+26.0	U. S. Naval Obs. transit circle position.	−2.95	−0 16.3	
5	21 57 41.70	+4.17	− 5 37 25.6	+26.5	½ (München I, 30092+München II, 12203).	−2.81	−0 14.6	
6	21 56 3.24	+4.17	− 5 35 39.0	+26.6	U. S. Naval Obs. transit circle position.	−2.83	−0 16.0	
7	21 54 6.92	+4.17	− 5 57 1.3	+26.7	⅓ (Mün. I, 29974+Rümk. 9700+W. B. XXI^h, 1209).	−2.82	−0 19.2	
8	21 50 53.90	+4.17	− 6 17 57.0	+26.6	½ (München I, 29848+Schj. 8922).	−2.74	−0 19.6	
						B. J. 1905.		
9	10 23 4.30	+2.08	+ 3 48 39.6	−15.7	Albany, A. G. 4047.....	−0.22	+0 0.5	
10	10 19 33.35	+2.09	+ 4 1 24.2	−15.9	" " 4030.....	−0.23	+0 1.7	
11	10 18 9.21	+2.10	+ 4 8 30.4	−16.0	" " 4021.....	−0.24	+0 0.6	
12	10 15 29.13	+2.10	+ 4 6 38.7	−16.1	" " 4007.....	−0.30	+0 3.0	
						B. J. 1906.		
13	16 12 56.03	+2.56	−17 9 4.9	+ 1.8	Washington, A. G. 5915.....	−8.20	+0 24.5	Seeing unst. and poor.
14	16 4 21.86	+2.63	−16 48 30.1	+ 1.1	" " 5880.....	−8.23	+0 24.1	Seeing good; good obs'n.
15	16 1 35.71	+2.65	−16 41 2.8	+ 0.9	" " 5862.....	−8.12	+0 24.3	Seeing a trifle unst.; clouds.
						B. J. 1907.		
16	0 22 40.41	+2.85	+ 6 42 30.6	+16.8	Leipzig II, A. G. 134.....	−7.36	−0 44.6	Seeing good.
17	0 15 54.37	+2.91	+ 6 12 47.1	+17.6	" " " 91.....	−7.35	−0 49.0	Seeing fair; bright Moon.
18	0 19 59.44	+2.91	+ 6 22 23.1	+17.4	" " " 113.....	−7.61	−0 50.3	Seeing fair; bright Moon.
19	0 17 10.80	+2.91	+ 6 14 15.1	+17.5	" " " 97.....	−7.44	−0 49.4	Seeing fair; bright Moon.
20	0 10 7.76	+2.97	+ 5 3 40.4	+18.7	½ (Leipzig II, A. G. 50+Albany, A. G. 33).	−7.87	−0 51.4	Seeing fair.
21	0 3 13.83	+2.98	+ 4 23 58.5	+19.1	Albany, A. G. 8.....	−8.01	−0 51.7	Seeing good.
22	0 5 24.44	+2.98	+ 4 21 45.3	+19.1	" " 19.....	−8.02	−0 53.4	Seeing good.
23	0 5 2.56	+2.98	+ 4 18 12.4	+19.1	" " 17.....	−8.01	−0 52.7	Seeing good.

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(80) SAPPHO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 3	12 8 37	+0 38.21	−11 41.0	13 49 10.58	−14 48 34.0	9.022$_n$	0.847	1	9, 2	F.	9.6-inch
17	12 11 48	−0 26.14	+ 3 40.2	13 36 27.35	−12 58 26.2	8.604	0.838	2	19, 4	F.	" "
19	10 56 24	−2 14.19	+20 18.9	13 34 39.31	−12 41 47.6	8.973$_n$	0.835	3	14, 4	F.	" "
1896											
Oct. 31	11 7 8	+2 1.48	− 5 6.2	1 35 45.12	+11 50 2.5	8.490	0.600	4	20, 3	F.	12-inch
1903											
Nov. 15	9 40 58	−0 51.74	+ 1 39.7	2 15 51.07	+11 50 53.5	9.074$_n$	0.604	5	30, 6	Hd.	12-inch
19	11 1 44	+3 38.92	− 5 33.7	2 13 26.61	+11 11 30.2	8.911	0.611	6	20, 4	Hd.	" "
20	10 9 20	+2 11.29	+ 7 56.3	2 12 56.26	+11 2 43.9	8.200$_n$	0.611	7	30, 6	Hd.	" "
22	9 11 0	+1 14.69	− 9 11.2	2 11 59.66	+10 45 36.3	9.062$_n$	0.619	8	30, 6	Hd.	" "
25	10 54 52	+0 10.59	+ 1 27.9	2 10 44.37	+10 20 53.2	9.078	0.625	9	30, 6	Hd.	" "
25	10 54 52	+0 9.83	+ 1 20.2	2 10 44.52	+10 20 53.7	9.078	0.625	10	30, 6	Hd.	" "
1906											
July 5	11 31 4	−2 35.12	+ 2 51.8	18 27 50.14	− 8 42 52.6	7.878$_n$	0.811	11	20, 4	R.	12-inch
5	11 53 30	−0 26.09	− 4 47.7	18 27 49.04	− 8 42 51.4	8.578	0.811	12	25, 5	R.	" "
6	11 1 52	−1 24.83	− 3 4.7	18 26 50.31	− 8 41 8.3	8.752$_n$	0.810	13	24, 5	R.	" "
13	10 40 36	−1 43.40	− 7 43.7	18 19 58.55	− 8 33 37.8	8.479$_n$	0.810	14	20, 4	R.	" "
19	11 58 22	−0 25.19	+ 1 1.2	18 14 38.01	− 8 34 11.8	9.257	0.805	15	24, 6	R.	" "
19	12 24 13	+1 34.31	+ 5 47.2	18 14 37.01	− 8 34 12.5	9.357	0.801	16	20, 4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1897. s	′ ″	
1	13 48 30.26	+2.11	−14 36 36.4	−16.6	Washington, A. G. 5214.....	+0.71	−0 0.1	Star double; used mean.
2	13 36 51.24	+2.25	−13 1 49.0	−17.4	Camb., U. S., A. G. Zones.....	+0.29	−0 2.2	
3	13 36 51.24	+2.26	−13 1 49.0	−17.5	" " " "	+1.73	+0 3.0	
						B. J. 1898.		
4	1 33 39.21	+4.43	+11 54 39.5	+29.2	Leipzig I, A. G. 482.....	−0.63	−0 0.5	
5	2 16 38.62	+4.19	+11 48 58.3	+15.5	Leipzig I, A. G. 685.....	....	.. ....	Seeing good.
6	2 9 43.53	+4.16	+11 16 48.0	+15.9	" " " 660.....	....	.. ....	Seeing good.
7	2 10 40.81	+4.16	+10 54 31.8	+15.8	" " " 668.....	....	.. ....	Seeing good.
8	2 10 40.81	+4.16	+10 54 31.8	+15.7	" " " 668.....	....	.. ....	Seeing good.
9	2 10 29.64	+4.14	+10 19 9.7	+15.6	" " " 665.....	....	.. ....	Seeing good.
10	2 10 30.55	+4.14	+10 19 17.9	+15.6	" " " 666.....	....	.. ....	Seeing good.
11	18 30 23.02	+2.24	− 8 45 53.5	+ 9.1	Wien-Ottakring, A. G. 6231.....	....	.. ....	Seeing good; full Moon; est. mag. 9.5.
12	18 28 12.90	+2.23	− 8 38 12.7	+ 9.0	" " " 6216.....	....	.. ....	Seeing good; full Moon.
13	18 28 12.90	+2.24	− 8 38 12.7	+ 9.1	" " " 6216.....	....	.. ....	Seeing fair; clouds.
14	18 21 39.68	+2.27	− 8 26 3.4	+ 9.3	" " " 6191.....	....	.. ....	Seeing good.
15	18 15 0.92	+2.28	− 8 35 22.5	+ 9.5	" " " 6155.....	....	.. ....	Seeing good to fair.
16	18 13 0.43	+2.27	− 8 40 9.1	+ 9.4	" " " 6143.....	....	.. ....	Seeing fair but rather unst.

(81) TERPSICHORE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 16	13 10 24	+0 3.29	+6 9.2	4 42 16.78	+35 33 56.6	9.471	0.034	1	35, 7	Hd.	12-inch
17	11 51 46	+2 9.52	−2 17.2	4 41 20.75	+35 31 45.9	9.110	9.776	2	30, 6	Hd.	" "
22	9 8 5	−1 48.07	−8 17.0	4 36 49.16	+35 18 27.7	9.317$_n$	9.906	3	29, 6	Hd.	" "

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(81) TERPSICHORE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 42 7.87	+5.62	+35 27 46.7	+0.7	Lund, A. G. 2369	....	.. ....	
2	4 39 5.60	+5.63	+35 34 1.9	+1.2	" " 2352	....	.. ....	Seeing good.
3	4 38 31.58	+5.65	+35 26 42.9	+1.8	" " 2345	....	.. ....	

(82) ALKMENE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 30	12 8 54	+1 57.79	+9 18.0	1 51 21.54	+11 5 36.0	9.118_n	0.616	1	25, 5	Fn.	26-inch
30	12 30 15	+0 47.31	−5 55.6	1 51 21.24	+11 5 37.0	8.948_n	0.613	2	25, 5	Fn.	" "
Oct. 8	10 55 54	−0 40.48	+3 52.1	1 45 12.23	+10 38 30.0	9.297_n	0.629	3	25, 5	Fn.	" "
23	9 53 16	−4 20.08	−0 38.3	1 31 59.78	+ 9 37 31.8	9.255_n	0.640	4	20, 4	Fn.	" "
23	10 27 38	−5 39.17	−8 43.6	1 31 58.62	+ 9 37 29.5	9.056_n	0.634	5	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1907. s	′ ″	
1	1 49 20.70	+3.05	+10 56 4.8	+13.2	Leipzig I, A. G. 569	−0.70	−0 6.4	Seeing poor.
2	1 50 30.87	+3.06	+11 11 19.5	+13.1	" " " 574	−0.34	−0 2.7	Seeing poor.
3	1 45 49.56	+3.15	+10 34 23.8	+14.1	½ (Leip. I, A. G. 554+Paris 2293)	−0.44	−0 1.8	
4	1 36 16.62	+3.24	+ 9 37 54.8	+15.3	Leipzig II, A. G. 633	−0.83	−0 6.0	Star double; used s. fol. component.
5	1 37 34.55	+3.24	+ 9 45 57.4	+15.7	" " " 643	−0.66	−0 2.2	

(83) BEATRIX.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 28	11 19 46	−0 55.58	+1 5.8	14 16 23.42	−15 17 4.1	8.830_n	0.851	1	29, 6	Hd.	12-inch
29	12 10 51	+1 28.91	+3 18.4	14 15 20.58	−15 14 50.0	8.684	0.851	2	30, 6	Hd.	" "
May 2	11 28 8	−1 29.23	+9 46.9	14 12 22.46	−15 8 21.5	7.980_n	0.851	3	30, 6	Hd.	" "
6	9 34 36	+0 33.94	+9 35.6	14 8 33.99	−14 59 42.9	9.297_n	0.840	4	24, 5	Hd.	" "
11	9 39 3	−1 59.47	−3 51.5	14 4 0.31	−14 49 12.3	9.154_n	0.844	5	35, 7	Hd.	" "

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(83) BEATRIX—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	14 17 16.25	+2.75	−15 18 1.8	−8.1	Washington, A. G. 5349	....	.. ....	
2	14 13 48.92	+2.75	−15 18 0.0	−8.4	" " 5334.....	....	.. ....	
3	14 13 48.92	+2.77	−15 18 0.0	−8.4	" " 5334.....	....	.. ....	
4	14 7 57.27	+2.78	−15 9 9.3	−9.2	" " 5307.....	....	.. ....	Ast. very ft.; rather poor obs'n.
5	14 5 57.00	+2.78	−14 45 11.6	−9.2	" " 5297.....	....	.. ....	Ast. faint.

(84) KLIO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 16	12 28 23	+2 21.64	+2 25.3	12 9 8.06	−9 59 57.3	7.823_n	0.820	1	30, 6	D.	26-inch
1905											
Aug. 23	12 7 27	+1 31.59	+3 50.2	22 54 5.79	−3 35 32.1	8.894_n	0.772	2	30, 6	R.	12-inch
26	11 42 58	+1 43.59	+0 23.1	22 51 9.89	−3 20 49.5	8.989_n	0.769	3	25, 5	R.	" "
26	12 0 21	+0 21.56	−0 14.1	22 51 9.00	−3 20 47.5	8.801_n	0.770	4	30, 6	R.	" "
26	12 30 23	−1 4.71	−1 39.7	22 51 7.62	−3 20 41.6	7.500_n	0.770	5	29, 6	R.	" "
31	11 16 57	+1 1.01	−0 12.4	22 46 2.29	−2 58 24.4	8.999_n	0.766	6	25, 5	R.	" "
31	11 33 27	+0 35.80	−2 59.9	22 46 1.48	−2 58 20.4	8.829_n	0.767	7	25, 5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1906. s	′ ″	
1	12 6 44.44	+1.98	−10 2 11.2	−11.4	Wien-Ottakring, A. G. 4493	+20.53	−2 15.2	Seeing fair; ast. very ft.
						B. J. 1907.		
2	22 52 31.48	+2.72	− 3 39 41.2	+18.9	Straszburg, A. G. 7933.....	− 8.28	+1 10.7	Seeing fair; thin clouds make obs'n difficult.
3	22 49 23.55	+2.75	− 3 21 31.9	+19.3	" " 7923.....	− 8.22	+1 11.2	Seeing poor; unst.
4	22 50 44.69	+2.75	− 3 20 52.7	+19.3	" " 7926.....	− 8.34	+1 12.7	Seeing fair.
5	22 52 9.58	+2.75	− 3 19 21.1	+19.2	" " 7929.....	− 8.38	+1 12.7	Seeing fair.
6	22 44 58.48	+2.80	− 2 58 31.6	+19.6	" " 7904.....	− 8.40	+1 15.6	Seeing good.
7	22 45 22.88	+2.80	− 2 55 40.1	+19.6	" " 7907.....	− 8.46	+1 14.5	Seeing good.

(86) SEMELE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 3	13 43 5	+1 32.68	+4 34.0	11 49 30.92	+8 12 12.5	9.473	0.671	1	24, 5	Fn.	26-inch
3	14 7 5	+1 54.42	+7 57.3	11 49 30.41	+8 12 13.1	9.522	0.678	2	20, 4	Fn.	" "

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(86) SEMELE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	11 47 57.05	+1.19	+8 7 46.2	−7.7	Leipzig II, A. G. 5946.....	....	.. ....	
2	11 47 34.80	+1.19	+8 4 23.5	−7.7	" " " 5945.....	....	.. ....	Star double; used n. fol. component.

(87) SYLVIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 31	11 21 54	−1 23.53	−10 44.3	2 18 31.85	+ 2 57 28.0	8.471_n	0.711	1	20, 4	F.	9.6-inch
Nov. 1	10 26 41	−2 8.41	−11 58.5	2 17 46.98	+ 2 56 13.7	9.111_n	0.712	2	20, 4	F.	" "
3	10 1 57	+0 55.41	−11 18.8	2 16 15.51	+ 2 53 55.7	9.199_n	0.713	3	20, 4	F.	" "
1897											
Feb. 24	11 35 0	−0 20.30	+11 23.5	10 43 45.89	+23 34 15.0	9.011_n	0.372	4	10, 2	F.	12-inch
Mar. 10	10 35 42	−1 53.54	− 6 22.4	10 33 52.85	+24 23 22.1	8.960_n	0.347	5	20, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1896. s	′ ″	
1	2 19 51.59	+3.79	+ 3 7 47.2	+25.1	Albany, A. G. 673.....	+0.82	−0 4.8	
2	2 19 51.59	+3.80	+ 3 7 47.2	+25.0	" " 673.....	+0.24	−0 3.5	
3	2 15 16.28	+3.82	+ 3 4 49.4	+25.1	" " 660.....	−0.42	−0 1.5	
						B. J. 1899.		
4	10 44 3.28	+2.91	+23 23 4.8	−13.3	Berlin B, A. G. 4112.....	−1.04	+0 5.1	
5	10 35 43.38	+3.01	+24 29 56.2	−11.7	" " " 4078.....	−0.09	+0 4.0	

(89) JULIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 19	10 28 40	+0 17.72	−2 41.5	0 31 36.49	+30 20 43.0	9.459_n	0.264	1	30, 8	Hd.	12-inch
20	10 4 10	−0 42.52	+2 14.1	0 30 36.26	+30 25 38.8	9.512_n	0.301	2	24, 8	Hd.	" "
21	10 0 31	−4 9.09	+0 40.9	0 29 34.70	+30 30 15.6	9.509_n	0.296	3	25, 5	Hd.	" "
25	10 22 0	+3 9.98	+5 52.5	0 25 15.56	+30 44 37.6	9.384_n	0.205	4	30, 6	Hd.	" "
25	10 51 36	+2 41.50	−2 31.4	0 25 14.07	+30 44 41.5	9.252_n	0.154	5	30, 6	Hd.	" "

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(89) JULIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	0 31 14.60	+4.17	+30 23 5.5	+19.0	½ (Camb., Eng., A. G. 350+Leiden, A. G. 191).	....	.. ....	Seeing very unst.
2	0 31 14.60	+4.18	+30 23 5.5	+19.2	½ (Camb., Eng., A. G. 350+Leiden, A. G. 191).	....	.. ....	Seeing very unst.
3	0 33 39.59	+4.20	+30 29 15.5	+19.2	½ (Camb., Eng., A. G. 372+Leiden, A. G. 203).	....	.. ....	Seeing unst.
4	0 22 1.36	+4.22	+30 38 24.2	+20.9	Leiden, A. G. 130.....	....	.. ....	Seeing fair.
5	0 22 28.34	+4.23	+30 46 52.0	+20.9	" " 135.....	....	.. ....	Seeing fair.

(90) ANTIOPE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1899	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 6	10 1 0	+3 27.32	+20 37.5	20 29 50.69	−22 8 51.3	9.263$_n$	0.875	1	15, 5	See	12-inch
6	10 34 23	+3 26.40	+20 34.5	20 29 49.77	−22 8 54.3	9.058$_n$	0.881	1	8, 6	U.	" "
6	10 49 13	+3 25.73	+20 32.7	20 29 49.10	−22 8 56.1	8.919$_n$	0.883	1	7, 7	See	" "
6	11 8 30	+3 25.14	+20 27.6	20 29 48.51	−22 9 1.2	8.634$_n$	0.885	1	20, 8	See	" "
7	10 42 25	+2 39.82	+17 37.0	20 29 3.19	−22 11 51.8	8.942$_n$	0.883	2	15, 10	See	" "
7	11 21 25	+2 38.59	+17 33.2	20 29 1.96	−22 11 55.6	7.572$_n$	0.885	2	20, 10	See	" "
8	9 24 13	+1 56.80	+14 59.0	20 28 20.18	−22 14 29.9	9.374$_n$	0.867	3	20, 10	See	" "
1904 May 12	13 37 51	−0 21.05	− 7 27.9	15 52 53.91	−19 23 31.5	9.147	0.867	4	10, 10	D.	26-inch
1905 Sept. 8	11 23 40	+2 33.56	+ 1 46.4	23 35 35.41	− 6 28 3.9	9.088$_n$	0.793	5	25, 5	Hd.	26-inch
8	11 41 51	+1 52.62	+ 2 22.8	23 35 34.89	− 6 28 8.3	8.938$_n$	0.794	6	25, 5	Hd.	" "
8	11 56 39	−1 27.57	+ 2 4.1	23 35 34.42	− 6 28 12.0	8.758$_n$	0.794	7	25, 5	Hd.	" "
14	11 32 1	+2 45.79	− 0 48.3	23 31 5.88	− 6 56 1.2	8.703$_n$	0.798	8	25, 5	Hd.	" "
14	11 49 28	+1 29.76	+ 3 57.2	23 31 5.45	− 6 56 4.6	8.187$_n$	0.798	9	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	20 26 18.56	+4.81	−22 29 45.2	+16.4	Algiers, A. G. Zones.....	....	.. ....	
2	20 26 18.56	+4.81	−22 29 45.2	+16.4	" " "	....	.. ....	
3	20 26 18.56	+4.82	−22 29 45.2	+16.3	" " "	....	.. ....	
						B. J. 1906.		
4	15 53 12.38	+2.58	−19 16 4.0	+ 0.4	Cincinnati 1885, 2683.....	−29.29	+1 42.9	
5	23 32 59.05	+2.80	− 6 30 9.7	+19.4	Wien-Ottakring, A. G. 8359.....	− 3.77	+1 17.0	Seeing excellent.
6	23 33 39.48	+2.79	− 6 30 50.5	+19.4	" " " 8362.....	− 3.71	+1 16.3	Seeing excellent.
7	23 36 59.21	+2.78	− 6 30 35.4	+19.3	" " " 8374.....	− 3.70	+1 15.4	Seeing excellent; proper motion — 0^s.0080, — 0″.113 applied.
8	23 28 17.25	+2.84	− 6 55 32.4	+19.5	" " " 8343.....	− 1.89	+1 28.1	Seeing good.
9	23 29 32.85	+2.84	− 7 0 21.3	+19.5	" " " 8347.....	− 1.74	+1 28.1	Seeing good.

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(86) SEMELE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	11 47 57.05	+1.19	+8 7 46.2	−7.7	Leipzig II, A. G. 5946.....	....	.. ....	
2	11 47 34.80	+1.19	+8 4 23.5	−7.7	" " " 5945.....	....	.. ....	Star double; used n. fol. component.

(87) SYLVIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 31	11 21 54	−1 23.53	−10 44.3	2 18 31.85	+ 2 57 28.0	8.471$_n$	0.711	1	20, 4	F.	9.6-inch
Nov. 1	10 26 41	−2 8.41	−11 58.5	2 17 46.98	+ 2 56 13.7	9.111$_n$	0.712	2	20, 4	F.	" "
3	10 1 57	+0 55.41	−11 18.8	2 16 15.51	+ 2 53 55.7	9.199$_n$	0.713	3	20, 4	F.	" "
1897											
Feb. 24	11 35 0	−0 20.30	+11 23.5	10 43 45.89	+23 34 15.0	9.011$_n$	0.372	4	10, 2	F.	12-inch
Mar. 10	10 35 42	−1 53.54	− 6 22.4	10 33 52.85	+24 23 22.1	8.960$_n$	0.347	5	20, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1896. s	′ ″	
1	2 19 51.59	+3.79	+ 3 7 47.2	+25.1	Albany, A. G. 673.....	+0.82	−0 4.8	
2	2 19 51.59	+3.80	+ 3 7 47.2	+25.0	" " 673.....	+0.24	−0 3.5	
3	2 15 16.28	+3.82	+ 3 4 49.4	+25.1	" " 660.....	−0.42	−0 1.5	
						B. J. 1899.		
4	10 44 3.28	+2.91	+23 23 4.8	−13.3	Berlin B, A. G. 4112.....	−1.04	+0 5.1	
5	10 35 43.38	+3.01	+24 29 56.2	−11.7	" " " 4078.....	−0.09	+0 4.0	

(89) JULIA.

DATE.	WASHINGTON MEAN TIME.	PLANET STAR. Δα	PLANET STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 19	10 28 40	+0 17.72	− 2 41.5	0 31 36.49	+30 20 43.0	9.459$_n$	0.264	1	30, 8	Hd.	12-inch
20	10 4 10	−0 42.52	+2 14.1	0 30 36.26	+30 25 38.8	9.512$_n$	0.301	2	24, 8	Hd.	" "
21	10 0 31	−4 9.09	+0 40.9	0 29 34.70	+30 30 15.6	9.509$_n$	0.296	3	25, 5	Hd.	" "
25	10 22 0	+3 9.98	+5 52.5	0 25 15.56	+30 44 37.6	9.384$_n$	0.205	4	30, 6	Hd.	" "
25	10 51 36	+2 41.50	−2 31.4	0 25 14.07	+30 44 41.5	9.252$_n$	0.154	5	30, 6	Hd.	" "

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(89) JULIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	0 31 14.60	+4.17	+30 23 5.5	+19.0	½ (Camb., Eng., A. G. 350+Leiden, A. G. 191).	....	.. ....	Seeing very unst.
2	0 31 14.60	+4.18	+30 23 5.5	+19.2	½ (Camb., Eng., A. G. 350+Leiden, A. G. 191).	....	.. ....	Seeing very unst.
3	0 33 39.59	+4.20	+30 29 15.5	+19.2	½ (Camb., Eng., A. G. 372+Leiden, A. G. 203).	....	.. ....	Seeing unst.
4	0 22 1.36	+4.22	+30 38 24.2	+20.9	Leiden, A. G. 130.....	....	.. ....	Seeing fair.
5	0 22 28.34	+4.23	+30 46 52.0	+20.9	" " 135.....	....	.. ....	Seeing fair.

(90) ANTIOPE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pJ. α	LOG pJ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1899	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 6	10 1 0	+3 27.32	+20 37.5	20 29 50.69	−22 8 51.3	9.263$_n$	0.875	1	15, 5	See	12-inch
6	10 34 23	+3 26.40	+20 34.5	20 29 49.77	−22 8 54.3	9.058$_n$	0.881	1	8, 6	U.	" "
6	10 49 13	+3 25.73	+20 32.7	20 29 49.10	−22 8 56.1	8.919$_n$	0.883	1	7, 7	See	" "
6	11 8 30	+3 25.14	+20 27.6	20 29 48.51	−22 9 1.2	8.634$_n$	0.885	1	20, 8	See	" "
7	10 42 25	+2 39.82	+17 37.0	20 29 3.19	−22 11 51.8	8.942$_n$	0.883	2	15, 10	See	" "
7	11 21 25	+2 38.59	+17 33.2	20 29 1.96	−22 11 55.6	7.572$_n$	0.885	2	20, 10	See	" "
8	9 24 13	+1 56.80	+14 59.0	20 28 20.18	−22 14 29.9	9.374$_n$	0.867	3	20, 10	See	" "
1904 May 12	13 37 51	−0 21.05	− 7 27.9	15 52 53.91	−19 23 31.5	9.147	0.867	4	10, 10	D.	26-inch
1905 Sept. 8	11 23 40	+2 33.56	+ 1 46.4	23 35 35.41	− 6 28 3.9	9.088$_n$	0.793	5	25, 5	Hd.	26-inch
8	11 41 51	+1 52.62	+ 2 22.8	23 35 34.89	− 6 28 8.3	8.938$_n$	0.794	6	25, 5	Hd.	" "
8	11 56 39	−1 27.57	+ 2 4.1	23 35 34.42	− 6 28 12.0	8.758$_n$	0.794	7	25, 5	Hd.	" "
14	11 32 1	+2 45.79	− 0 48.3	23 31 5.88	− 6 56 1.2	8.703$_n$	0.798	8	25, 5	Hd.	" "
14	11 49 28	+1 29.76	+ 3 57.2	23 31 5.45	− 6 56 4.6	8.187$_n$	0.798	9	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	20 26 18.56	+4.81	−22 29 45.2	+16.4	Algiers, A. G. Zones.....	....	.. ....	
2	20 26 18.56	+4.81	−22 29 45.2	+16.4	" " "	....	.. ....	
3	20 26 18.56	+4.82	−22 29 45.2	+16.3	" " "	....	.. ....	
						B. J. 1906.		
4	15 53 12.38	+2.58	−19 16 4.0	+ 0.4	Cincinnati 1885, 2683.....	−29.29	+1 42.9	
5	23 32 59.05	+2.80	− 6 30 0.7	+19.4	Wien-Ottakring, A. G. 8359.....	− 3.77	+1 17.0	Seeing excellent.
6	23 33 39.48	+2.79	− 6 30 30.5	+19.4	" " " 8362.....	− 3.71	+1 16.3	Seeing excellent.
7	23 36 59.21	+2.78	− 6 30 38.4	+19.3	" " " 8374.....	− 3.70	+1 15.4	Seeing excellent; proper motion — 0^s.0080, — 0″.113 applied.
8	23 28 17.25	+2.84	− 6 55 32.4	+19.5	" " " 8343.....	− 1.89	+1 28.1	Seeing good.
9	23 29 32.85	+2.84	− 7 0 21.3	+19.5	" " " 8347.....	− 1.74	+1 28.1	Seeing good.

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(92) UNDINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
June 22	11 41 6	−2 49.13	−1 0.3	18 6 12.45	−20 26 15.5	8.643$_n$	0.877	1	19,4	F.	9.6-inch
July 1	11 37 47	+0 2.42	−4 56.4	17 58 39.60	−20 54 37.0	8.608	0.879	2	18,4	F.	" "
1906											
May 22	10 25 41	+2 0.64	−6 27.9	15 53 39.39	− 9 53 46.7	9.243$_n$	0.813	3	25,5	Hd.	26-inch
June 2	11 10 14	−2 1.92	−0 2.3	15 44 55.51	− 9 52 49.4	8.219	0.819	4	25,5	Fn.	" "
2	11 27 31	−0 15.06	−3 47.2	15 44 54.90	− 9 52 48.9	8.712	0.819	5	25,5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1897. s	′ ″	
1	18 8 58.14	+3.44	−20 25 7.7	−7.5	Hedrick's Zodiacal Cat. 1187.....	−2.61	+0 6.8	
2	17 58 33.65	+3.53	−20 49 32.3	−8.3	Algiers, A. G. Zones.....	−2.66	+0 8.6	
						B. J. 1908.		
3	15 51 36.95	+1.80	− 9 47 19.2	+0.4	Wien-Ottakring, A. G. 5545.....	−4.38	+0 25.3	Seeing fair.
4	15 46 55.55	+1.88	− 9 52 47.6	+0.5	" " " 5526.....	−4.55	+0 25.0	
5	15 45 8.08	+1.88	− 9 49 2.2	+0.5	" " " 5518.....	−4.60	+0 25.8	

(93) MINERVA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 14	12 1 41	+3 9.17	− 3 31.9	23 45 26.29	− 4 30 55.0	8.201$_n$	0.780	1	20, 10	See	12-inch
15	11 38 32	+2 13.97	− 5 49.7	23 44 31.10	− 4 33 12.7	8.720$_n$	0.780	2	20, 10	See	" "
16	10 11 23	+1 21.52	− 8 1.7	23 43 38.66	− 4 35 24.7	9.322$_n$	0.776	3	20, 10	See	" "
17	11 33 12	+0 22.39	−10 25.7	23 42 39.53	− 4 37 48.7	8.641$_n$	0.780	4	20, 10	See	" "
18	10 6 0	−0 29.89	−12 30.3	23 41 47.25	− 4 39 53.3	9.305$_n$	0.777	5	30, 10	See	" "
Oct. 10	11 46 26	−0 37.61	− 7 16.7	23 23 45.72	− 5 11 46.0	9.292	0.781	6	25, 6	See	" "
13	11 57 29	−2 26.19	− 7 48.1	23 21 57.13	− 5 12 17.5	9.379	0.779	7	25, 5	See	" "
14	10 26 8	−2 57.17	− 7 42.4	23 21 26.15	− 5 12 11.8	8.885	0.784	8	25, 5	See	" "
1900											
Dec. 16	10 23 16	+0 13.83	+ 1 2.4	5 11 48.98	+35 10 55.2	9.212$_n$	9.853	9	20, 10	La.	26-inch
26	10 1 18	−0 50.23	− 1 36.9	5 1 29.31	+34 53 48.6	8.984$_n$	9.809	10	30, 5	Ei.	" "
29	8 7 52	−0 11.72	+ 3 10.5	4 58 44.53	+34 46 48.2	9.503$_n$	0.115	11	44, 10	Ei.	" "
1902											
Feb. 19	10 21 56	−2 8.56	− 0 10.2	10 50 1.86	+14 17 32.5	9.462$_n$	0.601	12	20, 8	M.	26-inch
Mar. 6	10 7 44	−2 58.84	− 5 27.2	10 36 3.13	+15 4 1.3	9.270$_n$	0.565	13	19, 8	M.	" "
9	11 6 26	−0 44.07	− 3 5.8	10 33 14.88	+15 11 10.6	8.598	0.546	14	8, 8	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	23 42 12.62	+4.50	−4 27 52.3	+29.2	U. S. Naval Obs. transit circle position.	....	.. ....	

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(93) MINERVA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
2	23 42 12.62	+4.51	− 4 27 52.3	+29.3	U. S. Naval Obs. transit circle position.	....	.. ....	
3	23 42 12.62	+4.52	− 4 27 52.3	+29.3	U. S. Naval Obs. transit circle position.	....	.. ....	
4	23 42 12.62	+4.52	− 4 27 52.3	+29.3	U. S. Naval Obs. transit circle position.	....	.. ....	
5	23 42 12.62	+4.52	− 4 27 52.3	+29.3	U. S. Naval Obs. transit circle position.	....	.. ....	Full Moon near.
6	23 24 18.80	+4.53	− 5 4 58.0	+28.7	Hedrick's Zodiacal Cat. 1568.....	....	.. ....	
7	23 24 18.80	+4.52	− 5 4 58.0	+28.6	" " " 1568.....	....	.. ....	
8	23 24 18.80	+4.52	− 5 4 58.0	+28.6	" " " 1568.....	....	.. ....	
9	5 11 28.44	+6.71	+35 9 50.3	+ 2.5	½ (Leiden, A. G. 1961+Lund, A. G. 2628).	....	.. ....	
10	5 2 12.77	+6.77	+34 55 20.7	+ 4.8	½ (Leiden, A. G. 1872+Lund, A. G. 2534).	....	.. ....	
11	4 58 49.51	+6.74	+34 43 32.2	+ 5.5	Leiden, A. G. 1851.....	....	.. ....	Ast. ft.
12	10 52 8.07	+2.35	+14 18 0.1	−17.4	Leipzig I, A. G. 4155.....	....	.. ....	Seeing bad.
13	10 38 59.50	+2.47	+15 9 45.7	−17.2	Berlin A, A. G. 4242.....	....	.. ....	Seeing good.
14	10 33 56.47	+2.48	+15 14 33.4	−17.0	" " " 4216.....	....	.. ....	Seeing good.

(94) AURORA.

[NOTE.—The identity of this asteroid is uncertain.]

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 6	8 3 17	−1 30.68	−7 5.6	4 10 44.91	+32 16 45.7	9.598_n	0.335	1	25, 5	Hd.	26-inch
7	8 3 6	+2 41.65	−2 51.1	4 9 48.25	+32 14 55.9	9.590_n	0.324	2	20, 4	Hd.	" "
11	8 4 41	+0 46.53	−3 57.2	4 6 8.40	+32 6 26.4	9.547_n	0.278	3	25, 5	Hd.	" "
1908											
Jan. 3	10 4 30	+4 50.24	+6 36.3	3 51 9.88	+31 0 12.5	9.159	0.118	4	15, 3	Fn.	12-inch
5	10 5 59	+0 52.86	+7 39.6	3 50 30.74	+30 54 12.3	9.221	0.137	5	25, 5	Fn.	"
Feb. 4	10 59 45	+2 33.82	−3 46.0	3 33 5.39	+29 36 55.0	9.680	0.529	6	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 12 11.73	+3.86	+32 23 44.5	+6.8	Leiden, A. G. 1630.....	....	.. ....	Seeing good; est. mag. 11.0; star has a ft. component s. pr.
2	4 7 2.74	+3.86	+32 17 39.6	+7.4	" " 1595.....	....	.. ....	
3	4 5 18.00	+3.87	+32 10 15.5	+8.1	" " 1583.....	....	.. ....	Seeing poor.
4	3 46 19.64	0.00	+30 53 36.1	+0.1	" " 1450.....	....	.. ....	Seeing good.
5	3 49 37.88	0.00	+30 46 32.5	+0.2	" " 1474.....	....	.. ....	Seeing good.
6	3 30 32.05	−0.48	+29 40 40.5	+0.5	Camb., Eng., A. G. 1746.....	....	.. ....	

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(95) ARETHUSA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG ρΔ. α	LOG ρΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1894	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 19	12 0 43	+0 35.45	+ 7 34.6	4 43 5.97	+21 15 32.1	8.986$_n$	0.429	1	18,4	F.	9.6-inch
21	12 32 24	−1 6.90	− 6 16.7	4 41 23.65	+21 1 40.8	7.948$_n$	0.427	2	15,3	F.	" "
Dec. 3	10 27 48	+1 18.20	− 1 15.2	4 30 52.52	+19 38 47.8	9.172$_n$	0.475	3	10,2	F.	" "
14	8 44 12	+2 2.97	−11 59.2	4 21 48.74	+18 25 39.9	9.391$_n$	0.525	4	14,3	F.	" "
15	8 4 12	+1 19.41	−18 2.7	4 21 5.19	+18 19 36.4	9.487$_n$	0.551	5	19,4	F.	" "
17	9 46 51	+4 6.89	− 3 29.0	4 19 34.98	+18 6 46.8	8.980$_n$	0.497	6	20,4	F.	" "
19	8 26 46	+2 54.55	− 5 59.3	4 18 15.49	+17 55 7.2	9.370$_n$	0.530	7	20,4	F.	" "
1906											
Jan. 5	10 8 43	+0 44.86	+ 3 36.6	6 27 19.38	+11 40 3.4	9.200$_n$	0.611	8	25,5	Hd.	26-inch
5	10 19 26	+0 9.64	− 4 20.0	6 27 18.99	+11 40 3.6	9.139$_n$	0.608	9	24,5	Hd.	" "
5	10 26 54	−0 11.59	+ 1 17.7	6 27 18.64	+11 40 3.2	9.090$_n$	0.607	10	25,5	Hd.	" "
6	10 59 14	−1 32.48	+ 2 36.2	6 26 25.12	+11 38 2.4	8.687$_n$	0.603	11	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 42 26.07	+4.45	+21 7 40.5	+17.0	Berlin B, A. G. 1531	....	.. ....	
2	4 42 26.07	+4.48	+21 7 40.5	+17.0	" " " 1531	....	.. ....	
3	4 29 29.72	+4.60	+19 39 44.7	+18.3	Berlin A, A. G 1229	....	.. ....	
4	4 19 41.12	+4.65	+18 37 20.1	+19.0	" " " 1172	....	.. ....	
5	4 19 41.12	+4.66	+18 37 20.1	+19.0	" " " 1172	....	.. ....	
6	4 15 23.44	+4.65	+18 9 56.4	+19.4	" " " 1143	....	.. ....	
7	4 15 16.30	+4.64	+18 0 47.1	+19.4	" " " 1141	....	.. ....	
						B. J. 1907 (extrapolated).		
8	6 26 33.78	+0.74	+11 36 35.7	− 8.9	Leipzig I, A. G. 2315	+32.97	−2 18.0	Seeing fair.
9	6 27 8.61	+0.74	+11 44 32.5	− 8.9	" " " 2322	+32.98	−2 16.9	Seeing fair.
10	6 27 29.49	+0.74	+11 38 54.4	− 8.9	" " " 2328	+32.90	−2 16.7	Seeing fair.
11	6 27 56.85	+0.75	+11 35 35.2	− 9.0	" " " 2333	+32.80	−2 16.4	Seeing good.

(100) HEKATE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG ρΔ. α	LOG ρΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 2	11 18 0	−0 55.01	+ 9 46.1	3 30 51.25	+9 39 29.2	9.238$_n$	0.639	1	25,5	Hd.	26-inch
2	11 18 0	−2 3.42	+ 1 40.0	3 30 51.22	+9 39 29.5	9.238$_n$	0.639	2	25,5	Hd.	" "
7	11 6 32	−1 53.05	+ 1 18.6	3 26 51.76	+9 23 42.1	9.176$_n$	0.640	3	25,5	Hd.	" "
10	12 47 18	+2 9.79	−10 4.9	3 24 20.42	+9 14 36.2	8.904	0.638	4	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	3 31 43.39	+2.87	+9 29 33.7	+9.4	Leipzig II, A. G. 1327	....	.. ....	Seeing poor; probably a mag. brighter than 12.0 as given in B. J. 1909.

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(100) HEKATE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
2	3 32 51.77	+2.87	+9 37 40.2	+9.3	Leipzig II, A. G. 1333.....	....	.. ....	Seeing poor.
3	3 28 41.87	+2.94	+9 22 14.2	+9.3	" " " 1306.....	....	.. ....	Est. mag. 11.0.
4	3 22 7.65	+2.98	+9 24 31.5	+9.6	Newcomb's Fund. Cat. 215.....	....	.. ....	

(101) HELENA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1893	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 10	12 5 47	+1 41.69	− 1 9.8	23 58 40.19	+8 20 51.2	9.234	0.655	1	9, 2	F.	9.6-inch
11	10 19 6	+0 53.72	− 2 48.9	23 57 52.22	+8 19 12.2	8.481_n	0.648	2	30, 6	F.	" "
14	8 23 45	−1 27.30	− 7 52.1	23 55 31.20	+8 14 9.1	9.352_n	0.661	3	20, 4	F.	" "
17	10 40 19	−3 45.15	−13 5.4	23 53 13.36	+8 8 56.0	8.842	0.652	4	2, 2	F.	" "
18	10 26 35	−4 24.44	−14 36.0	23 52 34.07	+8 7 25.5	8.708_n	0.651	5	25, 5	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 56 55.41	+3.09	+8 21 39.6	+21.4	Hedrick's Zodiacal Cat. 1605.....	....	.. ....	
2	23 56 55.41	+3.09	+8 21 39.6	+21.5	" " " 1605.....	....	.. ....	
3	23 56 55.41	+3.09	+8 21 39.6	+21.6	" " " 1605.....	....	.. ....	
4	23 56 55.41	+3.10	+8 21 39.6	+21.8	" " " 1605.....	....	.. ....	
5	23 56 55.41	+3.10	+8 21 39.6	+21.9	" " " 1605.....	....	.. ....	

(103) HERA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 30	9 38 53	−3 20.91	−6 39.4	3 21 56.09	+10 1 15.3	9.113_n	0.630	1	25, 5	Hd.	12-inch
Dec. 8	10 39 7	+3 49.81	+6 0.4	3 15 56.60	+ 9 53 28.3	8.824	0.628	2	25, 5	Hd.	" "

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(103) HERA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	3 25 13.02	+3.98	+10 7 47.8	+6.9	Leipzig II, A. G. 1287.....	....	.. ....	Seeing fair; est. mag. 10.0.
2	3 12 2.84	+3.95	+ 9 47 20.3	+7.6	" " " 1217.....	....	.. ....	Seeing fair.

(105) ARTEMIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
June 17	12 43 1	+1 26.75	+2 27.1	18 21 9.60	+17 13 39.4	8.099	0.508	1	30, 6	Hd.	12-inch
18	11 58 34	−2 56.25	+0 19.0	18 20 22.14	+17 17 3.5	8.847_n	0.510	2	30, 6	Hd.	" "
22	11 1 42	+2 13.89	−0 5.2	18 17 5.27	+17 25 55.2	9.169_n	0.517	3	25, 5	Hd.	" "
22	11 20 12	+0 32.69	+5 7.8	18 17 4.55	+17 25 56.0	9.042_n	0.512	4	30, 6	Hd.	" "
1907											
Feb. 12	9 53 55	−1 0.77	+1 36.6	9 28 38.90	−11 14 16.5	9.389_n	0.815	5	25, 5	Fn.	26-inch
15	10 37 25	−2 2.72	+4 39.6	9 25 54.49	−10 41 54.9	9.137_n	0.821	6	25, 5	Hd.	" "
15	10 54 48	−2 15.36	+2 53.6	9 25 53.52	−10 41 47.8	9.012_n	0.822	7	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	18 19 40.31	+2.54	+17 11 3.2	+ 9.1	Berlin A, A. G. 6767.....	....	.. ....	Seeing good; est. mag. 10.5.
2	18 23 15.84	+2.55	+17 16 35.2	+ 9.3	" " " 6808.....	....	.. ....	Seeing good.
3	18 14 48.79	+2.59	+17 25 50.2	+10.2	" " " 6720.....	....	.. ....	Seeing good.
4	18 16 29.27	+2.59	+17 20 38.0	+10.2	" " " 6739.....	....	.. ....	Seeing good.
5	9 29 38.75	+0.92	−11 15 46.3	− 6.8	Camb., U. S., A. G. Zones.....	....	.. ....	
6	9 27 56.28	+0.93	−10 46 27.3	− 7.2	" " " "	....	.. ....	Seeing excellent; est. mag. 11.5.
7	9 28 7.95	+0.93	−10 44 34.2	− 7.2	" " " "	....	.. ....	Seeing excellent; est. mag. 11.5.

(106) DIONE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1895	h m s	m s	′ ″	h m s	° ′ ″						
June 18	12 9 23	−3 26.69	−0 31.6	17 43 3.51	−26 2 11.2	8.524	0.900	1	15, 3	F.	9.6-inch
1906											
May 23	10 41 47	+0 31.86	+2 52.2	16 22 13.18	−21 51 30.6	9.306_n	0.871	2	25, 5	Hd.	26-inch

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(106) DIONE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1897. s	′ ″	
1	17 46 26.71	+3.49	−26 1 30.1	−9.5	Bonn VI, page 359, 101.....	+ 7.35	−0 17.8	
						B. J. 1908.		
2	16 21 39.35	+1.97	−21 54 24.6	+1.8	Radcliffe 1890, 4264.....	−10.70	+0 38.6	Seeing fair.

(108) HECUBA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 7	11 41 8	−2 19.46	+7 50.3	15 25 19.99	−24 34 18.4	8.960_n	0.892	1	30, 6	D.	26-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1906. s	′ ″	
1	15 27 36.78	+2.67	−24 42 7.6	−1.1	Microm. comp. with Cordoba Gen. Cat. 21077.. $-0^m 35^s.93$, $+5' 3''.4$	+7.49	−0 27.6	

(110) LYDIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 10	11 27 8	−2 3.94	+ 4 55.4	21 59 54.24	−22 27 54.9	8.968	0.884	1	29, 6	Hd.	12-inch
11	10 17 27	+2 21.85	+ 4 32.0	21 59 13.62	−22 29 11.9	8.674_n	0.886	2	30, 6	Hd.	" "
12	9 10 26	+1 42.13	+ 3 25.2	21 58 33.90	−22 30 18.7	9.251_n	0.877	3	30, 6	Hd.	" "
20	9 19 54	+1 38.12	+10 20.3	21 53 44.94	−22 32 51.7	8.920_n	0.885	4	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Bull. Astron. 20. m s	′	
1	22 1 54.58	+3.60	−22 33 12.9	+22.6	Algiers, A. G. Zones.....	−10 52	−53.2	Seeing good.

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(110) LYDIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Bull. Astron. 20. m s	′	
2	21 56 48.17	+3.60	−22 34 6.3	+22.4	Algiers, A. G. Zones	−10 50	−52.8	Seeing good; ft. at times; clouds.
3	21 56 48.17	+3.60	−22 34 6.3	+22.4	" " "	−10 48	−52.3	Seeing fair; very ft. at times.
4	21 52 3.26	+3.56	−22 43 33.6	+21.6	Cordoba Zones, XXI^h, 1584	−10 24	−48.8	Seeing very unst.

(113) AMALTHEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1897	h m s	m s	′ ″	h m s	° ′ ″						
May 26	10 26 39	−2 22.40	+ 3 41.0	15 45 1.97	−11 28 8.5	9.071_n	0.827	1	5, 1	F.	12-inch
June 2	10 52 54	+3 11.80	+ 7 42.6	15 38 45.72	−11 24 46.7	7.520	0.829	2	20, 4	F.	" "
1898											
Oct. 10	10 47 36	+0 18.97	+17 47.8	0 38 13.19	− 4 6 38.3	8.799_n	0.776	3	6, 2	F.	12-inch
12	10 19 32	−1 31.75	+ 7 2.3	0 36 22.47	− 4 17 24.0	8.996_n	0.777	4	24, 5	F.	" "
1904											
Mar. 13	11 1 20	+1 45.23	− 0 34.1	12 28 14.24	+ 5 14 18.2	9.366_n	0.693	5	30, 6	Hd.	12-inch
13	11 24 15	−2 21.31	+ 2 12.7	12 28 13.56	+ 5 14 26.6	9.282_n	0.691	6	30, 6	Hd.	" "
15	11 38 23	+0 7.57	− 4 14.0	12 26 38.19	+ 5 30 31.5	9.168_n	0.686	7	30, 6	Hd.	" "
16	11 29 51	−0 1.59	+ 2 19.6	12 25 49.82	+ 5 38 28.7	9.189_n	0.685	8	29, 6	Hd.	" "
20	12 7 12	−1 42.65	− 0 31.6	12 22 27.07	+ 6 10 11.5	8.645_n	0.675	9	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1899. s	′ ″	
1	15 47 20.93	+3.44	−11 31 33.7	−15.8	Camb., U. S., A. G. Zones	+1.03	−0 11.1	
2	15 35 30.45	+3.47	−11 32 13.3	−16.0	" " " "	+1.74	−0 10.9	
						B. J. 1900.		
3	0 37 49.61	+4.61	− 4 24 55.7	+29.6	Straszburg, A. G. 152	+8.20	−0 3.4	α very uncertain; chron. record illegible.
4	0 37 49.61	+4.61	− 4 24 55.7	+29.4	" " "	+1.37	+0 1.7	
						B. J. 1906.		
5	12 26 27.25	+1.76	+ 5 15 3.7	−11.4	Leipzig II, A. G. 6151	+1.41	−0 7.6	Seeing good.
6	12 30 33.11	+1.76	+ 5 12 25.2	−11.3	" " " 6176	+1.50	−0 6.8	Seeing good.
7	12 26 28.84	+1.78	+ 5 34 56.9	−11.4	" " " 6153	+1.51	−0 7.8	Seeing fair; sky thick; ast. ft.
8	12 25 49.62	+1.79	+ 5 36 20.5	−11.4	" " " 6148	+1.56	−0 6.8	Seeing good.
9	12 24 7.90	+1.82	+ 6 10 54.5	−11.4	" " " 6136	+1.62	−0 6.6	Seeing good; sky thick; ast. very ft.

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(114) KASSANDRA.

[NOTE.—The identity of this asteroid is uncertain. These observations are published in A. J. 558 under (119) Althaea.]

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 13	10 5 40	−1 8.51	+2 21.2	5 13 59.74	+14 59 56.2	9.308_n	0.569	1	30, 6	Hd.	12-inch
15	10 18 6	+2 19.11	+1 10.7	5 12 0.80	+14 58 11.9	9.206_n	0.562	2	30, 6	Hd.	" "
16	12 19 32	+1 15.05	+0 21.4	5 10 56.75	+14 57 22.5	8.986	0.554	3	29, 6	Hd.	" "
22	11 1 32	−0 18.13	+6 37.2	5 5 14.22	+14 54 36.8	7.513_n	0.550	4	29, 6	Hd.	" "
23	11 15 18	+1 3.06	−4 12.5	5 4 18.09	+14 54 25.6	8.547	0.551	5	29, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	5 15 3.53	+4.72	+14 57 39.3	−4.3	½ (Ber. A, A. G. 1474+Leip. I, A. G. 1600).	....	.. ....	Seeing poor.
2	5 9 36.95	+4.74	+14 57 5.1	−3.9	½ (Ber. A, A. G. 1436+Leip. I, A. G. 1571).	....	.. ....	Seeing fair.
3	5 9 36.95	+4.75	+14 57 5.1	−4.0	½ (Ber. A, A. G. 1436+Leip. I, A. G. 1571).	....	.. ....	Ast. very ft.
4	5 5 27.56	+4.79	+14 48 3.3	−3.7	Leipzig I, A. G. 1541.....	....	.. ....	Seeing good.
5	5 3 10.24	+4.79	+14 58 41.5	−3.4	½ (Ber. A, A. G. 1404+Leip. I, A. G. 1521).	....	.. ....	Seeing fair; clouds.

(116) SIRONA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 1	10 38 39	+1 47.89	+7 25.8	4 1 11.41	+20 43 12.5	8.932_n	0.440	1	25, 5	Hd.	12-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	3 59 19.17	+4.35	+20 35 42.6	+4.1	Berlin B, A. G. 1317.....	....	.. ....	Seeing fair; clouds interrupt.

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(117) LOMIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 13	10 32 0	−0 14.80	−5 26.9	11 20 33.10	+3 43 51.5	9.216_n	0.705	1	27, 6	Hd.	12-inch
13	10 44 42	+2 11.00	+3 11.0	11 20 32.81	+3 43 53.3	9.148_n	0.704	2	9, 2	Hd.	" "
15	10 5 32	+0 22.47	+5 35.7	11 18 44.29	+3 46 17.9	9.291_n	0.706	3	28, 6	Hd.	" "
25	12 10 4	+0 55.84	+0 33.2	11 9 54.17	+3 56 51.6	9.152	0.702	4	25, 5	Hd.	26-inch
27	9 46 27	+1 52.49	−3 12.0	11 8 21.62	+3 58 20.2	9.091_n	0.701	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	11 20 46.44	+1.46	+3 49 29.3	−10.9	Albany, A. G. 4268.....	....	.. ....	Seeing good.
2	11 18 20.35	+1.46	+3 40 53.3	−11.0	" " 4259.....	....	.. ....	Seeing good; clouds interrupt.
3	11 18 20.35	+1.47	+3 40 53.3	−11.1	" " 4259.....	....	.. ....	Seeing good; ast. very ft. from haze and moonlight.
4	11 8 56.87	+1.46	+3 56 29.8	−11.4	" " 4224.....	....	.. ....	Seeing excellent.
5	11 6 27.68	+1.45	+4 1 43.7	−11.5	" " 4214.....	....	.. ....	Seeing bad.

(118) PEITHO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1899	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 17	12 7 53	−0 19.72	+2 32.2	14 25 35.34	−11 23 2.9	8.829_n	0.828	1	10, 2	F.	12-inch
1906											
Feb. 15	12 43 19	−2 56.38	+3 32.6	9 41 4.29	+28 34 36.5	8.992	0.206	2	25, 5	Fn.	26-inch
27	12 8 16	−0 25.14	+7 10.7	9 29 17.15	+28 52 19.4	9.180	0.217	3	20, 4	Fn.	" "
27	12 34 54	+1 26.99	+5 20.2	9 29 16.30	+28 52 19.3	9.319	0.250	4	25, 5	Fn.	" "
27	12 57 37	−1 47.72	+6 47.0	9 29 15.38	+28 52 17.0	9.406	0.285	5	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1901. s	′ ″	
1	14 25 51.76	+3.30	−11 25 18.0	−17.1	Camb., U. S., A. G. Zones.....	+ 3.93	−0 34.6	
						B. J. 1908.		
2	9 43 59.66	+1.01	+28 31 12.8	− 8.9	Camb., Eng., A. G. 5099.....	−49.91	+3 9.6	
3	9 29 41.25	+1.04	+28 45 16.3	− 7.6	" " " 5017.....	−48.10	+2 47.8	
4	9 27 48.27	+1.04	+28 47 6.7	− 7.6	" " " 5005.....	−47.96	+2 48.0	
5	9 31 2.06	+1.04	+28 45 37.6	− 7.6	" " " 5024.....	−48.03	+2 45.9	Star double; used n. fol. component.

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(119) ALTHAEA.

[NOTE. - The identity of this asteroid in 1903 is uncertain. The observations for that year are published in A. J. 558 under (114) Kassandra.]

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1894	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 1	11 44 2	+2 1.09	+ 7 17.7	22 35 32.29	− 3 27 1.3	9.333	0.767	1	7, 2	F.	9.6-inch
2	10 38 14	+1 37.40	+ 1 11.3	22 35 8.60	− 3 33 7.7	9.000	0.771	2	20, 4	F.	" "
5	10 25 52	+0 30.33	−16 40.4	22 34 1.52	− 3 50 59.4	9.004	0.773	3	13, 5	F.	" "
6	10 42 45	−1 38.68	+ 8 49.2	22 33 43.59	− 3 57 13.6	9.152	0.773	4	20, 4	F.	" "
15	10 42 54	−0 14.26	+ 3 46.6	22 32 5.08	− 4 42 25.3	9.324	0.777	5	20, 4	F.	" "
16	11 14 53	−0 16.94	− 0 27.3	22 32 2.40	− 4 46 39.2	9.435	0.774	6	20, 4	F.	" "
17	9 18 4	−0 17.92	− 4 9.2	22 32 1.41	− 4 50 21.1	8.809	0.782	7	20, 4	F.	" "
19	11 18 9	−0 15.15	−11 55.7	22 32 4.17	− 4 58 7.5	9.471	0.773	8	20, 4	F.	" "
20	10 46 19	−0 11.13	−15 20.5	22 32 8.19	− 5 1 32.3	9.399	0.777	9	10, 2	F.	" "
1903											
Dec. 15	9 18 54	−1 17.68	− 3 15.5	5 20 28.15	+15 7 7.0	9.453_n	0.588	10	30, 6	Hd.	12-inch
17	10 51 3	+1 42.60	+ 7 10.0	5 18 25.00	+15 3 9.2	8.965_n	0.552	11	30, 6	Hd.	" "
22	11 49 25	−1 35.38	− 2 40.6	5 13 32.95	+14 54 53.9	8.894	0.553	12	30, 6	Hd.	" "
28	9 44 4	+2 44.21	+ 0 9.9	5 8 16.58	+14 48 9.3	9.078_n	0.559	13	30, 6	Hd.	" "
1907											
Dec. 2	12 3 9	+2 38.82	− 3 54.8	3 56 40.53	+14 7 3.3	9.009	0.568	14	25, 5	Hd.	26-inch
2	12 3 9	−1 16.07	− 6 39.4	3 56 40.20	+14 7 0.2	9.009	0.568	15	25, 5	Hd.	" "
6	11 2 14	−1 1.14	+ 8 33.7	3 53 9.92	+13 51 23.4	8.227	0.568	16	25, 5	Hd.	" "
6	11 15 20	+0 5.43	− 3 58.8	3 53 9.40	+13 51 19.2	8.641	0.569	17	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	22 33 27.81	+3.39	− 3 34 36.6	+17.6	Straszburg, A. G. 7856	....	.. ....	
2	22 33 27.81	+3.39	− 3 34 36.6	+17.6	" " 7856	....	.. ....	
3	22 33 27.81	+3.38	− 3 34 36.6	+17.6	" " 7856	....	.. ....	
4	22 35 18.88	+3.39	− 4 6 20.5	+17.7	Hedrick's Zodiacal Cat. 1514	....	.. ....	
5	22 32 16.04	+3.30	− 4 46 28.8	+16.9	" " " 1510	....	.. ....	
6	22 32 16.04	+3.30	− 4 46 28.8	+16.9	" " " 1510	....	.. ....	
7	22 32 16.04	+3.29	− 4 46 28.8	+16.9	" " " 1510	....	.. ....	
8	22 32 16.04	+3.28	− 4 46 28.8	+17.0	" " " 1510	....	.. ....	
9	22 32 16.04	+3.28	− 4 46 28.8	+17.0	" " " 1510	....	.. ....	
10	5 21 41.09	+4.74	+15 10 27.8	− 5.3	½ (Ber. A, A. G. 1525+Leip. I, A. G. 1637).	....	.. ....	Seeing fair; est. mag. 10.8.
11	5 16 37.64	+4.76	+14 56 4.0	− 4.8	½ (Ber. A, A. G. 1486+Leip. I, A. G. 1612).	....	.. ....	Seeing good.
12	5 15 3.53	+4.80	+14 57 39.3	− 4.8	½ (Ber. A, A. G. 1474+Leip. I, A. G. 1600).	....	.. ....	Seeing good.
13	5 5 27.56	+4.81	+14 48 3.3	− 3.9	Leipzig I, A. G. 1541	....	.. ....	Seeing good.
14	3 53 58.41	+3.30	+14 10 50.8	+ 7.3	Leipzig I, A. G. 1158	....	.. ....	Seeing poor.
15	3 57 52.96	+3.31	+14 13 32.6	+ 7.0	" " " 1183	....	.. ....	Seeing poor.
16	3 54 7.74	+3.32	+13 42 42.6	+ 7.1	" " " 1159	....	.. ....	Seeing good.
17	3 53 0.65	+3.32	+13 55 10.8	+ 7.2	" " " 1152	....	.. ....	Seeing good.

(121) HERMIONE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 21	11 57 10	+0 4.15	+5 48.1	10 39 32.57	+19 11 26.2	8.878_n	0.472	1	18, 4	F.	12-inch

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(121) HERMIONE—Continued.

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1898. s	′ ″	
1	10 39 25.89	+2.53	+19 5 48.9	−10.8	Berlin A, A. G. 4245.....	+2.65	+0 17.5	

(122) GERDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 29	11 14 39	−1 1.67	+ 1 35.0	12 59 30.47	−5 41 22.9	9.182_n	0.786	1	25,5	Hd.	26-inch
29	11 30 21	+1 11.38	− 4 27.6	12 59 30.20	−5 41 20.2	9.086_n	0.787	2	25,5	Hd.	" "
31	10 53 34	+3 58.88	+ 3 15.7	12 58 5.71	−5 31 32.0	9.241_n	0.784	3	20,4	Hd.	" "
31	11 6 53	−0 13.34	+ 5 24.2	12 58 5.49	−5 31 28.5	9.173_n	0.785	4	25,5	Hd.	" "
Apr. 9	9 43 17	−1 19.26	+ 1 14.8	12 51 38.98	−4 46 41.2	9.353_n	0.776	5	25,5	Hd.	" "
16	9 31 21	+0 24.00	− 2 59.3	12 46 48.17	−4 13 0.8	9.276_n	0.774	6	18,6	Hd.	" "
19	9 43 49	+2 8.23	+10 31.1	12 44 50.36	−3 59 21.0	9.145_n	0.774	7	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1907. s	′ ″	
1	13 0 30.51	+1.63	−5 42 50.1	−7.8	Strasburg, A. G. 4754.....	−33.29	+3 19.3	
2	12 58 17.19	+1.63	−5 36 44.7	−7.9	" " 4745.....	−33.09	+3 18.8	
3	12 54 5.19	+1.64	−5 34 39.5	−8.2	" " 4727.....	−33.33	+3 19.7	
4	12 58 17.19	+1.64	−5 36 44.7	−8.0	" " 4745.....	−33.14	+3 20.4	
5	12 52 56.56	+1.68	−4 47 47.7	−8.3	" " 4720.....	−33.29	+3 22.0	Seeing bad.
6	12 46 22.49	+1.68	−4 9 52.8	−8.7	" " 4693.....	−32.89	+3 19.7	Seeing very bad.
7	12 42 40.46	+1.67	−4 9 43.3	−8.8	" " 4686.....	−32.67	+3 19.3	

(124) ALKESTE.

	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
	$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
	′ ″	h m s	° ′ ″							
[illegible]	−0 49.2	12 26 45.05	−2 45 50.1	0.122n	0.704		1	27.6	Fn.	12-inch
[illegible]	−1 16.5	12 21 51.65	−2 6 52.9	0.384	0.757		2	18.5	Fn.	" "
[illegible]	−1 42.6	12 17 27.06	−1 30 11.7	0.434	0.751		3	32.7	Fn.	" "
[illegible]	−1 [illegible].2	12 12 20.83	−0 47 51.4	0.470	0.749		4	26.6	Fn.	" "
[illegible]	−2 [illegible].2	12 12 28.83	−0 47 43.3	0.534	0.745		5	17.4	Fn.	" "

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(124) ALKESTE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	12 24 52.06	+1.61	−2 47 35.7	−9.6	Straszburg, A. G. 4605.....	....	.. ....	Seeing good.
2	12 23 33.54	+1.62	−2 14 3.0	−9.4	Nicolajew, A. G. 3421.....	....	.. ....	Seeing good.
3	12 14 15.42	+1.59	−1 30 44.8	−9.8	" " 3394.....	....	.. ....	Seeing fair.
4	12 10 8.28	+1.55	−0 47 54.9	−9.6	" " 3382.....	....	.. ....	Seeing fair; obs'n difficult because of Moon.
5	12 8 44.86	+1.54	−0 42 29.6	−9.6	" " 3376.....	....	.. ....	Seeing fair; obs'n difficult because of Moon.

(126) VELLEDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 6	10 20 4	−1 57.21	+11 6.4	22 59 46.22	−8 57 39.0	8.601	0.813	1	25,5	R.	12-inch
8	10 34 54	−2 58.00	+9 38.3	22 58 45.42	−8 59 7.1	8.942	0.812	2	25,6	R.	" "
15	11 20 49	+2 23.36	−1 21.5	22 56 7.64	−8 58 31.4	9.364	0.803	3	19,4	R.	" "
15	11 42 40	+1 39.99	+5 7.6	22 56 7.61	−8 58 30.9	9.429	0.800	4	20,4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 1 40.88	+2.55	−9 9 2.3	+16.9	Wien-Ottakring, A. G. 8216.....	....	.. ....	Seeing poor; unst.; good measures.
2	23 1 40.88	+2.54	−9 9 2.3	+16.9	" " " 8216.....	....	.. ....	Seeing good to fair; clouds interfere.
3	22 53 41.81	+2.47	−8 57 26.4	+16.5	" " " 8173.....	....	.. ....	Seeing fair; high wind.
4	22 54 25.15	+2.47	−9 3 55.0	+16.5	" " " 8177.....	....	.. ....	Seeing fair; high wind.

(129) ANTIGONE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 3	10 48 59	−0 46.82	+2 2.2	16 33 29.84	−1 31 56.2	9.065_n	0.754	1	30,6	Hd.	12-inch
8	10 56 14	+0 48.30	+0 38.2	16 29 33.34	−1 43 20.9	8.745_n	0.756	2	30,6	Hd.	" "
14	12 20 22	−0 43.74	+0 27.7	16 25 5.31	−2 5 9.1	9.218	0.758	3	30,6	Hd.	" "
14	12 37 30	−1 40.36	−2 10.4	16 25 4.89	−2 5 11.4	9.293	0.757	4	30,6	Hd.	" "
15	11 10 49	+0 51.69	−3 42.3	16 24 26.17	−2 9 20.3	8.588	0.760	5	30,6	Hd.	" "

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(129) ANTIGONE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	16 34 13.79	+2.87	−1 34 1.1	+2.7	Nicolajew, A. G. 4184	....	.. ....	
2	16 28 42.14	+2.90	−1 44 2.1	+3.0	" " 4166	....	.. ....	
3	16 25 46.11	+2.94	−2 5 40.2	+3.4	" " 4151	....	.. ....	
4	16 26 42.31	+2.94	−2 3 4.4	+3.4	" " 4153	....	.. ....	
5	16 23 31.54	+2.94	−2 5 41.3	+3.3	" " 4140	....	.. ....	

(130) ELEKTRA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1897	h m s	m s	′ ″	h m s	° ′ ″						
June 21	11 40 3	−0 26.20	− 5 12.6	17 3 42.71	+ 6 58 1.4	8.890	0.666	1	20, 4	F.	12-inch
23	12 22 57	−1 55.91	−11 56.9	17 2 13.00	+ 6 51 17.5	9.252	0.672	2	21, 5	F.	" "
25	11 9 17	+1 14.47	− 7 16.9	17 0 49.33	+ 6 44 0.8	8.728	0.669	3	20, 4	F.	" "
1904											
Dec. 1	11 27 55	+1 21.52	− 5 58.0	4 29 47.82	−14 7 13.2	8.603_n	0.845	4	25, 5	Hd.	12-inch
8	11 50 45	+0 6.53	+ 3 53.3	4 24 4.90	−13 46 6.6	8.875	0.842	5	5, 1	Hd.	" "
12	10 12 57	−0 32.37	+ 2 51.1	4 21 4.89	−13 27 8.0	8.939_n	0.840	6	30, 6	Hd.	" "
12	10 30 17	−1 51.44	+ 0 10.5	4 21 4.29	−13 27 5.2	8.712_n	0.841	7	30, 6	Hd.	" "
18	10 16 26	+0 22.65	− 3 27.4	4 16 55.95	−12 49 3.7	8.364_n	0.838	8	30, 6	Hd.	" "
18	10 34 21	−1 39.25	− 1 54.0	4 16 55.46	−12 48 56.1	8.135	0.838	9	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						B. J. 1899.		
	h m s	s	° ′ ″	″		s	′ ″	
1	17 4 5.41	+3.50	+ 7 3 21.9	−7.9	Bonn VI, +7° 3314	+14.80	−0 55.4	
2	17 4 5.41	+3.50	+ 7 3 21.9	−7.5	" " +7° 3314	+14.57	−0 54.2	
3	16 59 31.36	+3.50	+ 6 51 25.1	−7.4	Leipzig II, A. G. 7614	+14.75	−0 57.2	
4	4 28 22.75	+3.55	−14 1 15.3	+0.1	Washington, A. G. 1252	.....	.. ....	Seeing good.
5	4 23 54.77	+3.60	−13 49 58.8	−1.1	" " 1225	.....	.. ....	Poor obs'n; clouds interrupt.
6	4 21 33.64	+3.62	−13 29 57.5	−1.6	Camb., U. S. A. G. 1225	.....	.. ....	Seeing poor.
7	4 22 52.11	+3.62	−13 27 14.1	−1.6	" " " 1225	.....	.. ....	Seeing poor.
8	4 16 29.67	+3.63	−12 45 34.0	−2.3	" " " 1225	.....	.. ....	Seeing good.
9	4 18 31.07	+3.64	−12 46 59.6	−2.5	" " " 1225	.....	.. ....	Seeing good.

(134) SOPHROSYNE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 5	10 9 16	−1 19.36	+3 45.6	4 53 54.60	+42 58 23.1	9.441_n	9.225_n	1	20, 4	F.	9.6-inch

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(134) SOPHROSYNE—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1894	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 14	10 32 54	+1 52.03	−1 52.1	4 42 40.36	+42 35 9.4	8.970_n	9.731_n	2	14, 3	F.	9.6-inch
15	8 43 58	+0 46.55	−5 35.1	4 41 34.90	+42 31 26.6	9.548_n	9.386	3	15, 3	F.	" "
17	10 52 29	−1 34.53	+5 37.4	4 39 10.55	+42 22 20.3	6.958	9.747_n	4	9, 2	F.	" "
19	9 31 32	−3 42.06	−3 48.4	4 37 3.04	+42 12 54.8	9.274_n	9.498_n	5	15, 3	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 55 8.29	+5.67	+42 54 21.9	+15.6	Bonn, A. G. 4064.....	....	.. ....	
2	4 40 42.61	+5.72	+42 36 42.9	+18.6	" " 3850.....	....	.. ....	
3	4 40 42.61	+5.74	+42 36 42.9	+18.8	" " 3850.....	....	.. ....	
4	4 40 39.35	+5.73	+42 16 23.8	+19.1	" " 3849.....	....	.. ....	
5	4 40 39.36	+5.74	+42 16 23.8	+19.4	" " 3849.....	....	.. ....	

(139) JUEWA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 17	12 8 9	−0 19.80	−12 57.1	6 0 58.49	+40 51 13.5	8.157_n	9.511_n	1	5, 1	F.	12-inch
1904											
Feb. 8	10 2 55	+0 43.56	+ 2 53.7	9 42 7.26	+27 38 47.9	9.492_n	0.367	2	30, 6	Hd.	12-inch
8	10 20 32	−0 21.23	+ 5 33.2	9 42 6.44	+27 38 48.6	9.444_n	0.340	3	10, 10	Hd.	" "
9	10 2 2	+1 50.60	− 3 41.7	9 41 2.78	+27 39 37.3	9.482_n	0.361	4	30, 6	Hd.	" "
11	12 7 43	+1 3.79	+ 2 47.9	9 38 46.98	+27 40 42.4	8.239_n	0.227	5	30, 6	Hd.	" "
1907											
Nov. 7	10 19 32	+0 53.48	+ 3 51.9	3 49 22.99	+33 42 51.4	9.512_n	0.178	6	25, 5	Hd.	26-inch
13	9 3 28	−1 26.65	+ 0 38.0	3 43 11.10	+33 46 58.2	9.611_n	0.304	7	25, 5	Hd.	" "
13	9 3 28	−3 14.88	− 9 44.1	3 43 11.04	+33 46 57.4	9.611_n	0.304	8	25, 5	Hd.	" "
16	10 10 6	+3 19.16	+ 6 28.2	3 39 51.58	+33 46 37.5	9.403_n	0.074	9	25, 5	Hd.	" "
16	10 10 6	+2 18.29	− 2 42.9	3 39 51.41	+33 46 38.4	9.403_n	0.074	10	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	6 1 10.97	+7.32	+41 4 10.2	+ 0.4	Bonn, A. G. 5014.....	....	.. ....	
2	9 41 22.06	+1.64	+27 36 8.4	−14.2	Camb., Eng., A. G. 5087.....	....	.. ....	Seeing good.
3	9 42 26.03	+1.64	+27 33 29.6	−14.2	" " " 5090.....	....	.. ....	Seeing good.
4	9 39 10.53	+1.65	+27 43 33.2	−14.2	" " " 5078.....	....	.. ....	Seeing very good.
5	9 37 41.51	+1.68	+27 38 8.6	−14.1	" " " 5068.....	....	.. ....	Seeing good.
6	3 48 26.01	+3.50	+33 38 53.5	+ 6.0	Leiden, A. G. 1469.....	....	.. ....	

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(139) JUEWA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
7	3 44 34.15	+3.60	+33 46 13.0	+7.2	Leiden, A. G. 1434.....	....	.. ....	
8	3 46 22.31	+3.61	+33 56 34.5	+7.0	" " 1452.....	....	.. ....	
9	3 36 28.79	+3.63	+33 40 1.0	+8.3	" " 1386.....	....	.. ....	Seeing good.
10	3 37 29.48	+3.64	+33 49 13.1	+8.2	" " 1395.....	....	.. ....	Seeing good.

(148) GALLIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 15	12 5 19	+3 5.33	−14 7.8	21 52 42.39	−12 40 54.2	8.260_n	0.837	1	19,4	F.	12-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1900. s	′ ″	
1	21 49 32.55	+4.51	−12 27 8.3	+21.9	Camb., U. S., A. G. Zones.....	+15.82	−0 51.3	

(153) HILDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 12	12 45 39	−1 8.93	−5 51.3	16 12 54.58	−18 41 32.6	8.022_n	0.869	1	30,6	D.	26-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1906. m s	′ ″	
1	16 14 0.97	+2.54	−18 35 43.2	+1.9	Radcliffe 1890, 4230.....	−1 13.49	+0 51.2	

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(154) BERTHA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 27	11 0 45	+0 19.00	+2 5.0	1 2 12.66	− 9 10 26.6	9.285$_n$	0.808	1	10, 10	D.	26-inch
27	11 28 44	+1 2.90	−0 6.9	1 2 11.72	− 9 10 28.8	9.146$_n$	0.811	2	30, 6	D.	" "
Oct. 13	11 14 45	+1 38.70	−4 11.0	0 48 25.62	− 9 24 36.7	8.181$_n$	0.816	3	30, 6	D.	" "
13	11 32 13	−1 2.49	−9 0.5	0 48 25.02	− 9 24 36.1	8.306	0.816	4	30, 6	D.	" "
1904											
Dec. 1	11 0 22	−3 19.59	−3 16.2	4 18 40.52	+38 10 13.1	8.959$_n$	9.142	5	30, 6	D.	26-inch
4	9 53 10	+1 38.56	+6 30.2	4 15 24.43	+38 14 32.7	9.340$_n$	9.587	6	29, 6	D.	" "
4	10 9 8	+2 38.92	+7 30.3	4 15 23.63	+38 14 34.4	9.256$_n$	9.454	7	14, 3	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	1 1 50.17	+3.49	− 9 12 52.8	+21.2	Wien-Ottakring, A. G. 225	+14.56	−5 52.9	Seeing unst.
2	1 1 5.33	+3.49	− 9 10 43.2	+21.3	" " " 224	+14.62	−5 53.1	Seeing unst.
3	0 46 43.33	+3.59	− 9 20 46.7	+21.0	" " " 168	+12.99	−5 31.8	
4	0 49 23.92	+3.59	− 9 15 56.5	+20.9	" " " 182	+13.02	−5 31.2	
						B. J. 1906.		
5	4 21 54.96	+5.15	+38 13 27.6	+ 1.7	Lund, A. G. 2249	−22.64	+6 14.2	Seeing poor.
6	4 13 40.70	+5.17	+38 7 59.4	+ 3.1	" " 2207	−22.99	+6 15.6	Seeing very poor; unst.
7	4 12 39.54	+5.17	+38 7 0.9	+ 3.2	" " 2198	−23.05	+6 16.4	Seeing thick; unst.; clouds interrupt.

(156) XANTHIPPE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 25	11 35 26	−0 39.68	+1 51.7	7 50 5.33	+7 54 32.2	7.508	0.653	1	30, 6	D.	26-inch
25	11 49 10	−0 46.85	+4 19.5	7 50 4.70	+7 54 30.4	8.491	0.654	2	29, 6	D.	" "
Feb. 4	10 44 23	−4 5.16	−1 20.5	7 40 51.19	+8 10 49.2	7.266$_n$	0.650	3	27, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 22.* s	′	
1	7 50 43.41	+1.60	+7 52 54.1	−13.6	Leipzig II, A. G. 4230	+35	−2.9	
2	7 50 49.95	+1.60	+7 50 24.5	−13.6	" " " 4234	+35	−2.9	
3	7 44 54.72	+1.63	+8 12 24.0	−14.3	" " " 4146	+34	−2.9	

* Veröffentlichungen des Königlichen Astronomischen Rechen-Institutes zu Berlin.

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(158) KORONIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 23	10 8 11	−2 41.40	− 4 50.7	12 0 50.20	−1 39 1.4	8.391	0.755	1	25, 5	Hd.	26-inch
24	8 35 28	+3 44.18	+ 6 23.0	12 0 23.19	−1 35 46.0	8.938_n	0.755	2	20, 4	Hd.	" "
25	9 27 34	+2 44.08	+10 42.2	11 59 54.33	−1 32 16.0	8.591_n	0.754	3	10, 2	Fn.	" "
27	8 23 28	+4 17.14	− 2 15.3	11 59 3.82	−1 26 3.5	9.168_n	0.753	4	20, 4	Hd.	" "
28	9 4 53	+2 24.50	− 8 18.4	11 58 38.64	−1 23 0.6	8.765_n	0.753	5	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	12 3 30.37	+1.23	−1 34 2.7	−8.0	Nicolajew, A. G. 3360.....	....	.. ....	Seeing good.
2	11 56 37.81	+1.20	−1 42 0.8	−8.2	" " 3335.....	....	.. ....	Seeing good; sky thick; ast. ft.
3	11 57 9.05	+1.20	−1 42 50.0	−8.2	" " 3340.....	....	.. ....	Clouds interrupt.
4	11 54 45.50	+1.18	−1 23 40.0	−8.2	" " 3330.....	....	.. ....	Seeing poor.
5	11 56 12.97	+1.17	−1 14 34.1	−8.1	" " 3333.....	....	.. ....	

(161) ATHOR.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 20	13 34 22	−0 5.70	−2 34.3	4 14 0.98	+31 59 57.9	9.248	0.091	1	10, 10	D.	26-inch
22	14 55 24	−0 41.45	−8 43.1	4 11 26.86	+32 0 34.2	9.558	0.294	2	30, 6	D.	" "
25	13 52 56	+1 35.20	+3 52.6	4 7 43.82	+32 0 6.3	9.435	0.184	3	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 14 1.54	+5.14	+32 2 29.8	+2.4	Leiden, A. G. 1648	....	.. ....	
2	4 12 3.14	+5.17	+32 9 14.5	+2.8	" " 1632.....	....	.. ....	Seeing very unst.
3	4 6 3.42	+5.20	+31 56 9.7	+4.0	" " 1588.....	....	.. ....	

(163) ERIGONE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 22	12 35 27	−3 19.98	+6 2.6	0 18 38.66	−1 21 31.2	8.609	0.754	1	30, 6	D.	26-inch

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(163) ERIGONE—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT.		LOG pJ.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 24	10 35 53	−0 21.93	−9 5.1	0 16 57.91	−1 37 40.8	9.243$_n$	0.754	2	10, 10	D.	26-inch
24	11 13 24	−2 27.49	+8 28.5	0 16 56.66	−1 37 52.6	9.015$_n$	0.755	3	29, 6	D.	" "
25	11 31 40	+1 24.34	+1 13.6	0 16 2.62	−1 46 24.8	8.763$_n$	0.756	4	35, 6	D.	" "
25	11 59 22	−3 22.60	−0 13.2	0 16 1.56	−1 46 34.3	7.491$_n$	0.756	5	30, 6	D.	" "
29	11 37 17	−0 26.51	+3 46.7	0 12 27.65	−2 19 56.4	7.918$_n$	0.761	6	10, 10	D.	" "
29	12 7 35	+0 15.36	−9 5.7	0 12 26.48	−2 20 15.0	8.718	0.761	7	10, 10	D.	" "
30	11 46 42	−1 50.50	+4 33.3	0 11 33.63	−2 28 16.2	8.306	0.762	8	28, 6	D.	" "
1905											
Apr. 9	11 25 23	+1 38.98	+1 11.7	13 12 4.72	−2 7 56.3	9.851$_n$	0.759	9	30, 6	Hd.	26-inch
16	10 59 55	−2 5.98	−4 5.6	13 5 48.68	−1 19 27.1	8.737$_n$	0.752	10	5, 1	Hd.	" "
23	11 35 17	−0 16.39	+1 56.3	13 0 3.83	−0 37 32.3	8.914	0.746	11	30, 6	Hd.	" "
May 1	10 10 16	−1 3.97	+0 21.4	12 54 37.95	−0 0 45.6	8.137$_n$	0.740	12	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′	
1	0 21 55.06	+3.58	−1 27 56.4	+22.6	Nicolajew, A. G. 67	....	....	Est. mag. 11.5.
2	0 17 16.24	+3.60	−1 28 58.5	+22.8	" " 50	....	....	Seeing very unst.
3	0 19 20.56	+3.59	−1 46 43.9	+22.8	" " 58	....	....	Seeing very unst.
4	0 14 34.68	+3.60	−1 48 1.4	+23.0	" " 41	....	....	Seeing fine.
5	0 19 20.56	+3.60	−1 46 43.9	+22.8	" " 58	....	....	Seeing fine.
6	0 12 50.55	+3.61	−2 24 6.3	+23.2	Straszburg, A. G. 57	....	....	
7	0 12 7.50	+3.62	−2 11 32.5	+23.2	" " 51	....	....	
8	0 13 20.51	+3.62	−2 33 12.7	+23.2	" " 58	....	....	Seeing steady.
						Veröff. 26.		
9	13 10 24.08	+1.66	−2 9 0.5	− 7.5	Nicolajew, A. G. 3555	+2	+0.2	Seeing much improved.
10	13 7 52.98	+1.68	−1 15 13.9	− 7.6	" " 3544	+2	+0.3	Seeing very bad; clouds
11	13 0 18.55	+1.67	−0 39 21.0	− 7.6	" " 3525	+3	+0.3	interrupt.
12	12 55 40.28	+1.64	−0 0 59.6	− 7.4	" " 3509	+3	+0.3	

(168) SIBYLLA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pJ.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 9	9 43 16	+2 20.68	− 3 46.1	23 56 29.58	+2 36 25.7	9.094$_n$	0.715	1	25, 5	Hd.	26-inch
10	11 13 47	+3 9.92	+ 0 43.9	23 55 51.67	+2 30 36.1	8.809	0.716	2	20, 4	Hd.	" "
10	11 33 27	+3 28.18	− 2 59.6	23 55 51.08	+2 30 31.2	9.013	0.716	3	20, 4	Hd.	" "
12	10 12 43	+2 24.23	−10 47.2	23 54 43.71	+2 19 59.7	8.597$_n$	0.717	4	24, 5	Hd.	" "
12	10 27 55	−0 56.81	+10 13.2	23 54 43.49	+2 19 56.5	7.963$_n$	0.717	5	25, 5	Hd.	" "

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(168) SIBYLLA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 54 6.38	+2.52	+2 39 55.1	+16.7	Albany, A. G. 8215	....	.. ....	Seeing fair.
2	23 52 39.24	+2.51	+2 29 35.5	+16.7	" " 8209	....	.. ....	Seeing good.
3	23 52 20.39	+2.51	+2 33 14.1	+16.7	" " 8207	....	.. ....	Seeing good.
4	23 52 16.97	+2.51	+2 30 30.1	+16.8	" " 8206	....	.. ....	Seeing poor.
5	23 55 37.78	+2.52	+2 9 26.6	+16.7	" " 8223	....	.. ....	Seeing poor.

(169) ZELIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 26	12 55 12	−0 45.10	−2 46.3	0 51 33.08	+8 25 37.2	8.703	0.647	1	30, 6	R.	12-inch
Oct. 3	13 11 52	+2 5.33	+0 32.8	0 44 26.42	+8 8 23.6	9.180	0.656	2	25, 5	Fn.	26-inch
3	13 33 36	−3 13.94	−0 52.8	0 44 25.43	+8 8 21.4	9.284	0.659	3	25, 5	Fn.	" "
8	12 9 29	−2 37.47	+6 38.5	0 39 23.79	+7 54 15.3	8.890	0.655	4	25, 5	Fn.	" "
8	12 38 30	+1 10.55	−9 18.8	0 39 22.45	+7 54 10.4	9.129	0.657	5	23, 5	Fn.	" "
12	11 10 28	+1 4.05	+1 3.9	0 35 29.76	+7 42 29.3	7.200$_n$	0.656	6	25, 5	Fn.	" "
12	11 27 30	+0 38.36	+6 5.5	0 35 28.96	+7 42 29.1	8.516	0.656	7	24, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	0 52 15.16	+3.02	+8 28 6.8	+16.7	Leipzig II, A. G. 323	....	.. ....	Seeing fair; poor obs'n because of faintness of ast.
2	0 42 18.02	+3.07	+8 7 33.2	+17.6	" " " 260	....	.. ....	
3	0 47 36.30	+3.07	+8 8 56.9	+17.3	" " " 296	....	.. ....	
4	0 41 58.17	+3.09	+7 47 18.8	+18.0	" " " 257	....	.. ....	
5	0 38 8.81	+3.09	+8 3 11.0	+18.2	" " " 232	....	.. ....	
6	0 34 22.62	+3.09	+7 41 7.0	+18.4	" " " 209	....	.. ....	
7	0 34 47.51	+3.09	+7 36 5.2	+18.4	" " " 213	....	.. ....	

(170) MARIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 1	11 11 14	−3 9.00	+0 55.7	2 44 25.94	+39 54 0.9	9.103$_n$	8.893$_n$	1	30, 6	D.	26-inch
6	10 8 14	+0 49.96	+1 45.1	2 38 53.89	+39 31 40.8	9.342$_n$	9.276	2	30, 6	D.	" "
6	10 25 4	−1 11.64	+5 5.7	2 38 53.28	+39 31 37.2	9.252$_n$	8.908	3	30, 6	D.	" "
6	10 44 59	−2 29.53	+0 35.7	2 38 52.29	+39 31 33.4	9.110$_n$	8.253$_n$	4	30, 6	D.	" "

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(170) MARIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1906. m s	′ ″	
1	2 47 30.12	+4.82	+39 52 55.5	+9.7	Lund, A. G. 1474	+1 20.20	+2 47.7	
2	2 37 59.10	+4.83	+39 29 44.0	+11.7	" " 1360	+1 20.04	+3 2.7	
3	2 40 0.09	+4.83	+39 26 20.1	+11.4	" " 1381	+1 20.24	+3 2.8	
4	2 41 16.99	+4.83	+39 30 46.4	+11.3	" " 1403	+1 20.21	+3 3.4	

(171) OPHELIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR	NO. COMP.	OBS'R.	INSTRUMENT.
1895	h m s	m s	′ ″	h m s	° ′ ″						
May 27	12 10 37	+2 11.12	−5 7.0	16 30 51.95	−19 48 38.0	7.571	0.875	1	19,4	F.	9.6-inch
1897 Oct. 4	13 15 48	−1 22.03	−2 41.5	1 16 5.89	+ 4 9 47.5	9.048	0.699	2	19,4	F.	12-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1897. s	′ ″	
1	16 28 37.87	+2.96	−19 43 16.4	−14.6	Algiers, A. G. Zones	− 0.74	+0 37.0	
						B. J. 1899.		
2	1 17 23.47	+4.45	+ 4 11 59.8	+29.2	Albany, A. G. 373	+10.39	+0 59.1	

(172) BAUCIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 16	13 26 49	−1 42.73	+3 6.9	22 22 8.15	−11 19 49.1	8.964	0.827	1	35,7	R.	12-inch
Sept. 23	10 14 50	−1 13.78	−1 38.3	21 47 24.16	−10 15 0.2	8.880	0.820	2	30,6	R.	" "

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(172) BAUCIS—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Bull. Astron. 21. m s	′ ″	
1	22 23 47.85	+3.03	−11 23 15.8	+19.8	Camb., U. S., A. G. Zones.....	+2 51	+0 30.4	Seeing good; ast. ft., but obs'n fairly good.
2	21 48 34.88	+3.06	−10 13 43.6	+21.7	" " " "	+2 31	+0 26.7	Seeing good; ast. very ft.; full Moon; poor obs'n.

(174) PHÆDRA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 29	7 38 1	+0 38.43	−8 50.0	3 44 38.77	+37 26 48.5	9.668$_n$	0.281	1	25, 5	Hd.	26-inch
Dec. 6	6 55 29	+1 26.23	−1 3.8	3 37 45.90	+36 57 16.3	9.676$_n$	0.319	2	25, 5	Hd.	" "
7	6 55 0	−3 39.08	+0 56.8	3 36 49.59	+36 52 34.3	9.670$_n$	0.308	3	15, 3	Hd.	" "
11	7 21 48	−4 5.64	−0 46.8	3 33 14.41	+36 32 33.9	9.591$_n$	0.160	4	15, 3	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	3 43 56.40	+3.94	+37 35 29.3	+ 9.2	Lund, A. G. 1959.....	....	.. ....	
2	3 36 15.73	+3.94	+36 58 9.5	+10.6	" " 1910.....	....	.. ....	Seeing good; star double; used s. pr. component.
3	3 40 24.71	+3.96	+36 51 27.1	+10.4	" " 1941.....	....	.. ....	Clouds interrupt.
4	3 37 16.11	+3.94	+36 33 9.5	+11.2	" " 1919.....	....	.. ....	Seeing poor.

(175) ANDROMACHE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 30	10 35 32	+0 11.21	+ 7 32.4	6 27 43.59	+27 28 5.8	9.238$_n$	0.279	1	15, 3	Hd.	26-inch
31	8 17 43	+2 14.16	− 0 50.9	6 26 55.20	+27 28 38.8	9.614$_n$	0.473	2	25, 5	Hd.	" "
31	8 17 43	+1 41.11	− 2 10.5	6 26 55.16	+27 28 40.3	9.614$_n$	0.473	3	25, 5	Hd.	" "
1908											
Jan. 5	7 43 33	+1 11.63	+10 30.8	6 22 31.36	+27 31 10.7	9.628$_n$	0.489	4	25, 5	Hd.	" "
5	8 0 32	−1 27.27	− 5 1.2	6 22 30.74	+27 31 10.7	9.604$_n$	0.461	5	25, 5	Hd.	" "

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(175) ANDROMACHE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 32. s	′	
1	6 27 28.35	+4.03	+27 20 38.7	−5.3	Camb., Eng., A. G. 3316.....	+9	−0.3	Clouds interrupt.
2	6 24 36.99	+4.05	+27 29 35.7	−5.0	" " " 3283.....	+8	−0.3	Seeing fair.
3	6 25 10.00	+4.05	+27 30 55.8	−5.0	" " " 3291.....	+8	−0.3	Seeing fair; a beautiful red star.
4	6 21 19.38	+0.35	+27 20 42.5	−2.6	" " " 3230.....	+8	−0.2	Seeing excellent.
5	6 23 57.66	+0.35	+27 36 14.5	−2.6	" " " 3274.....	+8	−0.2	Seeing excellent.

(178) BELISANA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 16	8 53 30	−0 27.09	+1 26.1	10 38 58.18	+11 51 0.8	9.608_n	0.670	1	25, 5	Fn.	26-inch
25	10 44 42	+0 30.94	+4 53.7	10 30 25.82	+12 40 39.7	9.232_n	0.598	2	25, 5	Fn.	" "
25	11 8 36	+1 0.35	+0 56.9	10 30 24.97	+12 40 44.9	9.093_n	0.592	3	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1908. s	′ ″	
1	10 39 24.31	+0.96	+11 49 43.5	−8.8	Leipzig I, A. G. 4099.....	+9.09	−0 20.7	Seeing excellent.
2	10 29 53.83	+1.05	+12 35 55.1	−9.1	" " " 4057.....	+9.19	−0 18.4	Seeing fair.
3	10 29 23.57	+1.05	+12 39 57.1	−9.1	" " " 4056.....	+9.33	−0 18.4	Seeing fair.

(179) KLYTÆMNESTRA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 23	8 31 43	+1 15.41	+4 57.3	22 26 6.86	+3 17 22.2	9.316_n	0.711	1	25, 5	Hd.	26-inch
23	8 31 43	−3 32.12	+1 18.8	22 26 6.81	+3 17 23.7	9.316_n	0.711	2	25, 5	Hd.	" "
25	8 47 0	−3 37.68	+3 32.4	22 25 0.70	+3 5 43.2	9.210_n	0.711	3	19, 4	Hd.	" "

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(179) KLYTÆMNESTRA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	22 24 49.08	+2.37	+3 12 8.1	+16.8	Albany, A. G. 7778	....	.. ....	
2	22 29 36.55	+2.38	+3 15 48.1	+16.8	" " 7806	....	.. ....	
3	22 28 36.01	+2.37	+3 1 53.9	+16.9	" " 7799	....	.. ....	Seeing fair; est. mag. 10.5.

(182) ELSA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan 13	10 15 41	−0 18.19	−5 26.4	6 51 43.19	+22 55 48.7	9.157$_n$	0.399	1	29, 6	Hd.	12-inch
13	10 15 51	+0 3.33	+5 12.2	6 51 42.90	+22 55 49.5	9.156$_n$	0.399	2	30, 6	Hd.	" "
14	11 10 25	+2 5.19	+2 7.5	6 50 40.88	+22 58 24.4	8.208$_n$	0.378	3	29, 6	Hd.	" "
15	9 24 24	+1 11.15	−4 59.3	6 49 47.06	+23 0 45.4	9.356$_n$	0.428	4	30, 6	Hd.	" "
17	9 40 48	+1 0.20	−1 44.2	6 47 53.13	+23 5 36.9	9.244$_n$	0.405	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	6 51 59.78	+1.60	+23 1 26.7	−11.6	Berlin B, A. G. 2694	....	.. ....	Seeing good.
2	6 51 37.97	+1.60	+22 50 48.9	−11.6	" " " 2690	....	.. ....	Seeing good.
3	6 48 34.08	+1.61	+22 56 28.4	−11.5	" " " 2657	....	.. ....	Seeing good; ast. very ft. and difficult.
4	6 48 34.29	+1.62	+23 5 56.1	−11.4	" " " 2658	....	.. ....	Seeing good.
5	6 46 51.30	+1.63	+23 7 32.5	−11.4	" " " 2640	....	.. ....	Seeing a trifle unst.

(184) DEJOPEJA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 30	13 34 11	+0 31.29	+7 44.4	7 55 30.22	+21 43 49.4	9.442	0.478	1	25, 5	Fn.	26-inch
31	12 31 29	−1 47.47	−5 57.7	7 54 43.41	+21 45 35.9	9.220	0.434	2	25, 5	Fn.	" "
Feb. 2	11 59 40	+2 18.92	+2 58.0	7 53 9.16	+21 49 7.3	9.079	0.420	3	25, 5	Fn.	" "
2	12 24 16	+1 22.68	−8 24.0	7 53 8.31	+21 49 8.9	9.232	0.434	4	25, 5	Fn.	" "
2	12 49 59	+3 31.07	−5 45.4	7 53 7.52	+21 49 9.4	9.345	0.452	5	25, 5	Fn.	" "

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(184) DEJOPEJA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1908. s	′ ″	
1	7 54 58.01	+0.92	+21 36 14.0	−9.0	Berlin B, A. G. 3211	−22.78	+1 6.5	Reading of the micrometer changed by 1 rev.
2	7 56 29.95	+0.93	+21 51 42.6	−9.0	" " " 3221	−23.00	+1 5.3	
3	7 50 49.31	+0.93	+21 46 18.3	−9.0	" " " 3184	−22.69	+1 5.2	
4	7 51 44.70	+0.93	+21 57 41.9	−9.0	" " " 3192	−22.73	+1 5.2	
5	7 49 35.52	+0.93	+21 55 3.8	−9.0	" " " 3172	−22.66	+1 3.8	

(189) PHTHIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 1	10 1 19	+1 45.42	−8 48.2	2 11 38.74	+11 8 46.6	9.239_n	0.620	1	25, 5	Fn.	26-inch
2	9 49 12	−0 4.88	+6 21.7	2 10 45.71	+11 1 40.3	9.272_n	0.623	2	10, 10	Hd.	" "
11	11 9 31	+1 28.80	−1 22.7	2 3 8.52	+10 0 18.7	8.766	0.627	3	25, 5	Hd.	" "
14	8 56 19	+0 33.94	+4 59.5	2 0 57.41	+9 42 32.0	9.252_n	0.639	4	25, 5	Hd.	" "
14	9 8 56	+0 56.34	+2 36.0	2 0 57.01	+9 42 29.3	9.190_n	0.636	5	25, 5	Hd.	" "
14	9 25 28	+1 56.14	+3 29.8	2 0 56.50	+9 42 24.5	9.089_n	0.634	6	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	2 9 49.95	+3.37	+11 17 21.7	+13.1	Leipzig I, A. G. 660	....	.. ....	Seeing steady, but diffuse.
2	2 10 47.22	+3.37	+10 55 5.5	+13.1	" " " 668	....	.. ....	
3	2 1 36.36	+3.36	+10 1 27.8	+13.6	Leipzig II, A. G. 797	....	.. ....	Seeing bad; ast. very ft. because of Moon.
4	2 0 20.11	+3.36	+9 37 18.9	+13.6	" " " 790	....	.. ....	Seeing fair.
5	1 59 57.31	+3.36	+9 39 39.7	+13.6	" " " 789	....	.. ....	Seeing fair.
6	1 58 57.00	+3.36	+9 38 41.0	+13.7	" " " 781	....	.. ....	Seeing fair.

(190) ISMENE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 1	11 47 44	+0 53.54	+6 39.0	2 20 57.06	+8 21 38.8	8.405	0.648	1	20, 4	F.	9-6-inch
3	11 4 55	−0 21.25	−1 31.5	2 19 42.29	+8 13 28.3	8.630_n	0.650	2	15, 3	F.	" "
1897											
Mar. 31	12 12 15	+2 16.58	−7 37.6	11 55 15.98	+1 18 43.5	9.046	0.728	3	20, 4	F.	12-inch
Apr. 1	11 3 38	+1 45.37	−2 55.0	11 54 44.77	+1 23 26.1	8.205_n	0.727	4	20, 4	F.	" "
3	10 49 5	+0 39.43	+6 38.0	11 53 38.82	+1 32 59.2	8.435_n	0.725	5	19, 4	F.	" "

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(190) ISMENE—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 9	10 30 46	−1 10.96	+4 56.1	12 45 15.80	− 2 18 11.8	9.099$_n$	0.760	6	25,5	Hd.	26-inch
16	10 24 35	+3 10.94	−1 49.7	12 41 17.44	− 1 45 54.1	8.881$_n$	0.756	7	25,5	Hd.	" "
22	11 22 25	−0 55.74	+6 38.8	12 38 8.93	− 1 20 35.7	8.964	0.752	8	30,6	Hd.	" "
1906											
May 22	11 6 19	+1 29.79	+2 17.9	15 56 45.56	−13 9 6.6	9.015$_n$	0.837	9	25,5	Hd.	26-inch
25	12 51 38	+1 34.88	+8 4.5	15 54 49.13	−13 2 12.8	9.140	0.835	10	25,5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1896. s	′ ″	
1	2 19 59.69	+3.83	+ 8 14 34.6	+25.2	Leipzig II, A. G. 900	+ 7.76	+0 26.0	
2	2 19 59.69	+3.85	+ 8 14 34.6	+25.2	" " " 900	+ 9.46	+0 33.9	
						B. J. 1899.		
3	11 52 56.66	+2.74	+ 1 26 38.6	−17.5	Albany, A. G. 4385	+11.45	−0 56.6	
4	11 52 56.66	+2.74	+ 1 26 38.6	−17.5	" " 4385	+12.14	−0 54.1	
5	11 52 56.66	+2.73	+ 1 26 38.6	−17.4	" " 4385	+11.59	−0 55.7	
						B. J. 1907.		
6	12 46 25.11	+1.65	− 2 22 59.4	− 8.5	Nicolajew, A. G. 3472	+11.34	−0 56.7	Seeing bad.
7	12 38 4.86	+1.64	− 1 43 55.6	− 8.8	" " 3450	+11.52	−0 57.7	Seeing very bad; ast.
8	12 39 3.04	+1.63	− 1 27 5.9	− 8.6	" " 3457	+11.38	−0 57.9	very ft. from moonlight.
						B. J. 1908.		
9	13 33 13.92	+1.85	−13 11 24.9	+ 0.4	Camb., U. S., A. G. Zones	+ 3.62	−0 6.8	Seeing fair.
10	13 33 12.38	+1.87	−13 10 17.7	+ 0.4	Radcliffe 1890, 4127	+ 3.46	−0 3.7	Seeing poor.

(192) NAUSIKAA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 5	11 33 19	+1 19.03	1 38.8	23 16 36.60	− 4 28 5.1	9.036$_n$	0.778	1	30,6	Hd.	12-inch
4	11 26 41	+0 23.19	− 0 13.7	23 15 40.77	− 4 26 39.9	9.050$_n$	0.778	2	30,6	Hd.	" "
10	12 0 48	+1 8.95	+ 1 23.2	23 9 51.70	− 4 18 43.9	8.154	0.778	3	30,6	Hd.	" "
11	10 47 13	+0 13.32	+ 2 34.8	23 8 56.08	− 4 17 32.3	9.087$_n$	0.776	4	30,6	Hd.	" "
12	9 51 0	+0 43.60	+ 11 9.7	23 7 59.79	− 4 16 20.2	9.337$_n$	0.773	5	30,6	Hd.	" "
1905											
Mar. 2	11 5 14	− 3 27.34	+ 0 48.5	10 31 45.49	+10 19 44.7	8.961$_n$	0.624	6	19,5	Hd.	12-inch
3	10 22 34	+ 2 24.90	1 40.4	10 28 47.43	+10 30 26.7	9.166$_n$	0.625	7	24,5	Hd.	" "
5	10 40 49	+0 23.64	+ 0 32.8	10 28 46.61	+10 30 28.2	9.044$_n$	0.622	8	27,6	Hd.	" "
10	11 39 54	+ 3 38.82	2 17.1	10 23 56.50	+10 47 12.3	8.764	0.616	9	24,5	Hd.	" "
13	9 26 32	−0 7.52	− 3 9.1	10 21 18.25	+10 55 54.7	9.254$_n$	0.623	10	30,6	Hd.	" "
13	9 40 14	−0 47.73	+ 0 20.2	10 21 17.97	+10 55 56.6	9.185$_n$	0.620	11	30,6	Hd.	" "
1907											
Nov. 4	11 10 47	−1 13.58	+ 4 35.6	4 17 11.92	+34 10 36.8	9.482$_n$	0.125	12	25,5	Fn.	12-inch
15	11 4 17	+1 12.94	− 8 5.5	4 5 53.05	+34 22 34.2	9.304$_n$	9.970	13	25,5	Fn.	" "
16	10 38 21	−1 54.14	− 7 18.9	4 4 45.01	+34 22 1.5	9.394$_n$	0.032	14	25,5	Fn.	" "

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(192) NAUSIKAA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		m s	′	
1	23 15 14.08	+3.49	− 4 26 50.3	+24.0	Straszburg, A. G. 8030	.. ..	....	Seeing good.
2	23 15 14.08	+3.50	− 4 26 50.3	+24.1	" " 8030	.. ..	....	Seeing good.
3	23 8 39.22	+3.53	− 4 20 31.5	+24.4	" " 8002	.. ..	....	Seeing good.
4	23 8 39.22	+3.54	− 4 20 31.5	+24.4	" " 8002	.. ..	....	Seeing good.
5	23 7 12.65	+3.54	− 4 27 54.4	+24.5	" " 7998	.. ..	....	Seeing fair.
6	10 35 11.45	+1.38	+10 19 7.9	−11.7	Leipzig I, A. G. 4081	.. ..	....	Seeing fair.
7	10 26 21.14	+1.39	+10 32 18.9	−11.8	" " " 4045	.. ..	....	Seeing excellent.
8	10 28 21.58	+1.39	+10 30 7.2	−11.8	" " " 4054	.. ..	....	Seeing excellent.
9	10 20 16.30	+1.38	+10 49 41.1	−11.7	" " " 4017	.. ..	....	Seeing fair.
10	10 21 24.39	+1.38	+10 59 15.5	−11.7	" " " 4021	.. ..	....	Seeing good.
11	10 22 4.32	+1.38	+10 55 48.1	−11.7	" " " 4025	.. ..	....	Seeing good.
						Veröff. 32.		
12	4 18 22.09	+3.41	+34 5 58.2	+ 3.0	Leiden, A. G. 1672	−4 5	−7.7	Seeing good; star double; used s. pr. component.
13	4 4 36.45	+3.66	+34 30 34.2	+ 5.5	" " 1579	−4 14	−9.7	Seeing good.
14	4 6 35.48	+3.67	+34 29 15.0	+ 5.4	" " 1591	−4 15	−9.9	Seeing good.

(194) PROKNE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1897	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 26	13 29 38	−0 14.12	+10 24.9	22 27 49.85	− 6 40 18.5	9.221	0.793	1	20, 4	F.	12-inch
28	11 1 8	+0 48.45	−12 12.6	22 26 47.02	− 7 16 40.7	9.040_n	0.799	2	19, 4	F.	" "
Sept. 3	11 13 4	+2 5.02	− 9 3.7	22 23 31.19	− 9 10 47.4	8.516_n	0.814	3	25, 5	F.	" "
4	10 10 47	−4 56.83	+ 6 25.2	22 23 1.77	− 9 28 44.5	9.169_n	0.812	4	20, 4	F.	" "
8	7 52 56	+2 21.98	+ 2 42.9	22 21 7.26	−10 40 0.0	9.543_n	0.795	5	30, 6	F.	" "
10	9 43 16	−5 4.48	− 4 45.6	22 20 11.81	−11 16 40.5	9.178_n	0.824	6	24, 5	F.	" "
15	8 31 31	+3 27.37	+ 4 5.9	22 18 18.13	−12 39 51.6	9.388_n	0.823	7	20, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1899. m s	′ ″	
1	22 27 59.66	+4.31	− 6 51 6.3	+22.9	Mic. comp. with Wien-Ottak., A. G. 8042 {+0m 50s.54 / +8′ 46″.5}	+1 16.21	+0 56.9	Reading of micrometer increased by 1 rev.
2	22 25 54.25	+4.32	− 7 4 50.8	+22.7	Hedrick's Zodiacal Cat. 1504	+1 16.42	+0 50.6	
3	22 21 21.79	+4.38	− 9 2 6.4	+22.7	Wien-Ottakring, A. G. 8021	+1 15.97	+0 43.3	
4	22 27 54.20	+4.40	− 9 35 32.9	+23.2	" " " 8047	+1 15.99	+0 36.0	
5	22 18 40.83	+4.45	−10 43 5.5	+22.6	Camb., U. S., A. G. Zones	+1 15.03	+0 34.4	
6	22 25 11.83	+4.46	−11 12 17.8	+22.9	Hedrick's Zodiacal Cat. 1503	+1 14.82	+0 33.6	
7	22 14 46.29	+4.47	−12 44 19.3	+21.8	Camb., U. S., A. G. Zones	+1 13.33	+0 23.1	

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(196) PHILOMELA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$A\alpha$	$A\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 14	11 42 57	+0 25.64	−7 18.6	23 50 57.42	−12 36 34.4	8.866_n	0.835	1	30, 6	Hd.	12-inch
15	11 0 38	+2 21.54	−7 58.3	23 50 13.41	−12 40 57.0	9.171_n	0.832	2	25, 5	Hd.	" "
19	11 32 9	−3 56.17	+3 1.6	23 47 9.50	−12 58 10.3	8.680_n	0.838	3	20, 4	Hd.	" "
24	11 32 46	+1 44.11	+0 3.3	23 43 21.67	−13 17 11.4	7.173	0.840	4	40, 8	Hd.	" "
24	11 45 12	−2 37.88	+4 1.0	23 43 21.30	−13 17 14.8	8.432	0.840	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Bull. Acad. St Peters. XIX.		
	h m s	s	° ′ ″	″		s	′	
1	23 50 28.31	+3.47	−12 29 39.6	+23.8	Camb., U. S., A. G. Zones.....	+39	+4.9	Seeing fine.
2	23 47 48.39	+3.48	−12 33 22.6	+23.9	" " " "	+39	+4.9	Seeing good.
3	23 51 2.17	+3.50	−13 1 35.6	+23.7	" " " "	+38	+4.7	Seeing very unst.
4	23 41 34.03	+3.53	−13 17 38.2	+23.5	" " " "	+38	+4.8	Seeing very unst. and poor.
5	23 45 55.66	+3.52	−13 21 39.3	+23.5	" " " "	+38	+4.7	Seeing very poor.

(198) AMPELLA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$A\alpha$	$A\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 26	11 46 20	−0 56.86	+2 26.0	5 9 55.77	+27 38 55.5	9.152_n	0.258	1	35, 7	Hd.	12-inch
27	11 7 22	+1 54.34	−6 16.8	5 8 50.86	+27 33 4.4	9.330_n	0.298	2	30, 6	Hd.	" "
Dec. 6	11 4 16	−0 25.55	−0 33.2	4 58 28.50	+26 34 33.8	9.086_n	0.287	3	29, 6	Hd.	" "
7	9 51 12	+1 32.04	−2 24.7	4 57 22.82	+26 27 58.8	9.418_n	0.362	4	28, 5	Hd.	" "
7	10 16 36	+1 32.89	−3 45.0	4 57 21.63	+26 27 52.1	9.325_n	0.331	5	30, 6	Hd.	" "
11	9 37 7	+0 26.13	+3 27.7	4 52 50.48	+25 59 51.3	9.396_n	0.366	6	30, 6	Hd.	" "
11	9 54 10	−0 54.59	−6 25.4	4 52 49.71	+25 59 50.2	9.333_n	0.346	7	30, 6	Hd.	" "
1905											
Mar. 16	10 45 43	+0 38.27	−0 48.4	11 0 17.54	− 8 30 46.0	8.886_n	0.809	8	24, 5	Hd.	26-inch
16	10 58 27	+1 40.37	−1 14.5	11 0 17.06	− 8 30 43.1	8.711_n	0.809	9	25, 5	Hd.	" "
16	11 14 47	+1 4.60	+3 43.0	11 0 16.47	− 8 30 38.6	8.268_n	0.810	10	25, 5	Hd.	" "
25	10 54 23	+4 2.81	−0 57.6	10 52 48.67	− 7 35 8.2	8.427	0.803	11	20, 4	Hd.	" "
25	11 14 6	+2 16.91	+3 46.8	10 52 48.05	− 7 35 2.8	8.822	0.802	12	25, 5	Hd.	" "
28	9 48 35	−2 42.84	+4 28.4	10 50 35.86	− 7 16 14.7	8.888_n	0.800	13	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						B. J. 1905.		
	h m s	s	° ′ ″	″		s	′ ″	
1	5 10 47.68	+4.95	+27 36 33.8	−4.3	Camb., Eng., A. G. 2388	+22.74	−0 41.2	Seeing fair.

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(198) AMPELLA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
2	5 6 51.54	+4.98	+27 39 24.9	− 3.7	Camb., Eng., A. G. 2350	+22.99	−0 40.9	Seeing very unst.
3	4 58 48.97	+5.08	+26 35 9.4	− 2.4	" " " 2284	+22.92	−0 32.2	Seeing good.
4	4 55 45.69	+5.09	+26 30 25.5	− 2.0	" " " 2265	+22.89	−0 32.4	Seeing fair.
5	4 55 43.65	+5.09	+26 31 39.1	− 2.0	" " " 2264	+22.96	−0 30.4	Seeing fair.
6	4 52 19.24	+5.11	+25 56 24.9	− 1.3	" " " 2242	+22.56	−0 30.2	Seeing fair.
7	4 53 39.18	+5.12	+26 6 17.1	− 1.5	" " " 2249	+22.62	−0 26.3	Seeing fair.
						B. J. 1907.		
8	10 59 37.69	+1.58	− 8 29 45.3	−12.3	Wien-Ottakring, A. G. 4184	+ 9.42	−1 5.8	
9	10 58 35.12	+1.57	− 8 29 16.2	−12.4	" " " 4179	+ 9.41	−1 6.0	
10	10 59 10.29	+1.58	− 8 34 9.3	−12.3	" " " 4182	+ 9.44	−1 5.5	
11	10 48 44.34	+1.52	− 7 33 57.3	−13.3	" " " 4129	+ 9.01	−1 5.1	
12	10 50 29.61	+1.53	− 7 38 36.3	−13.3	" " " 4135	+ 9.05	−1 4.9	
13	10 53 17.18	+1.52	− 7 20 29.7	−13.4	" " " 4154	+ 9.08	−1 5.2	

(199) BYBLIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 6	11 23 18	−1 7.82	−5 23.7	2 9 42.28	−5 59 34.2	8.461	0.791	1	27, 6	Fk.	26-inch
8	9 1 42	+0 45.41	−9 56.0	2 8 16.16	−6 0 8.5	9.356_n	0.785	2	30, 6	Fk.	" "
8	9 29 38	+1 43.70	+5 31.3	2 8 15.45	−6 0 8.6	9.246_n	0.788	3	30, 6	Fk.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	2 10 46.33	+3.77	−5 54 25.1	+14.6	Wien-Ottakring, A. G. 488	−33.09	−3 55.8	Seeing poor; unst.; very diff.; poor obs'n.
2	2 7 26.98	+3.77	−5 50 27.2	+14.7	" " " 470	−32.96	−3 55.3	
3	2 6 27.98	+3.77	−6 5 54.7	+14.8	" " " 466	−32.78	−3 55.2	

(200) DYNAMENE.

[NOTE.—The identity of this asteroid is uncertain.]

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 6	9 26 33	+0 59.04	−6 36.2	4 14 16.07	+32 42 26.5	9.395_n	0.124	1	30, 6	Hd.	26-inch

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(200) DYNAMENE—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 7	8 47 24	−2 0.38	+1 47.7	4 13 16.81	+32 38 27.1	9.502_n	0.212	2	20, 4	Hd.	26-inch
11	8 40 0	+2 16.11	+2 49.4	4 9 22.73	+32 20 36.9	9.466_n	0.193	3	20, 4	Fn.	" "
1908											
Jan. 5	8 46 39	+0 5.87	+0 49.3	3 54 18.78	+30 10 55.8	8.389_n	0.118	4	25, 5	Fn.	12-inch
Feb. 4	12 0 33	+1 24.12	−9 56.3	3 52 34.11	+29 5 58.1	9.705	0.602	5	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 13 13.15	+3.88	+32 48 56.0	+6.7	Leiden, A. G. 1636.....	....	.. ....	Seeing good; est. mag. 10.5.
2	4 15 13.30	+3.89	+32 36 32.7	+6.7	" " 1655.....	....	.. ....	Star double; used fol. component.
3	4 7 2.74	+3.88	+32 17 39.6	+7.9	" " 1595.....	....	.. ....	Seeing poor.
4	3 54 12.89	+0.02	+30 10 6.5	0.0	½ (Camb., Eng., A. G. 1943+Leiden, A. G. 1499).	....	.. ....	Seeing good.
5	3 51 10.35	−0.36	+29 15 54.0	+0.4	Camb., Eng., A. G. 1926.....	....	.. ....	

(202) CHRYSEIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 4	10 30 11	+0 5.67	+ 0 40.1	14 36 40.65	−1 37 11.8	9.174_n	0.754	1	30, 6	Hd.	12-inch
11	11 43 30	+2 14.49	−12 24.8	14 31 28.64	−1 16 4.4	8.778	0.752	2	30, 6	Hd.	" "
13	11 27 14	+0 10.75	−11 51.3	14 30 4.48	−1 11 26.3	8.663	0.751	3	28, 6	Hd.	" "
15	10 38 56	+2 42.34	− 9 15.0	14 28 43.77	−1 8 30.1	8.505_n	0.751	4	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	14 36 32.78	+2.20	−1 37 47.3	−4.6	Nicolajew, A. G. 3777.....	....	.. ....	Seeing good.
2	14 29 11.93	+2.22	−1 3 35.2	−4.4	" " 3761.....	....	.. ....	Seeing unst.
3	14 29 51.50	+2.23	−0 59 30.8	−4.2	" " 3763.....	....	.. ....	Seeing very good.
4	14 25 59.20	+2.23	−0 59 10.9	−4.2	" " 3755.....	....	.. ....	Seeing very unst.

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(207) HEDDA.

[Note.—The observations of this asteroid are published in A. J. 556 under (73) Klytia.]

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 25	13 4 10	+2 15.95	+8 18.0	0 59 58.57	+4 2 17.8	8.595	0.699	1	33, 6	D.	26-inch
27	10 9 27	+0 28.80	+0 18.3	0 58 11.47	+3 54 18.2	9.435_n	0.708	2	30, 6	D.	" "
28	11 32 26	−1 1.31	+6 4.7	0 57 10.14	+3 49 42.4	9.057_n	0.703	3	30, 6	D.	" "
29	13 58 41	+2 19.59	+3 40.0	0 56 5.07	+3 44 55.3	9.262	0.706	4	30, 6	D.	" "
29	14 24 57	+2 41.96	−1 52.9	0 56 4.02	+3 44 49.5	9.361	0.708	5	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	0 57 39.00	+3.62	+3 53 39.2	+20.6	Albany, A. G. 268.....	....	.. ....	Seeing fine.
2	0 57 39.00	+3.67	+3 53 39.2	+20.7	" " 268.....	....	.. ....	Seeing unst.
3	0 58 7.77	+3.68	+3 43 16.9	+20.8	" " 273.....	....	.. ....	Seeing fair; transits on star diff. because of faintness of threads.
4	0 53 41.79	+3.69	+3 40 54.2	+21.1	" " 245.....	....	.. ....	Seeing good.
5	0 53 18.37	+3.69	+3 46 21.3	+21.1	" " 241.....	....	.. ....	Seeing good.

(208) LACRIMOSA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 1	12 5 32	−4 13.04	+2 5.6	4 48 8.25	+24 56 12.7	6.409_n	0.321	1	30, 6	D.	26-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	4 52 16.77	+4.52	+24 54 9.0	−1.9	Berlin B, A. G. 1581.....	....	.. ....	Seeing fair.

(211) ISOLDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 4	10 29 16	+1 46.69	+3 4.9	0 26 0.68	+9 10 46.0	9.107_n	0.641	1	25, 5	Fn.	26-inch
4	10 48 37	+1 0.73	+0 0.4	0 26 0.07	+9 10 42.5	8.953_n	0.639	2	25, 5	Fn.	" "

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(211) ISOLDA—Continued

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 11	10 31 16	+0 14.10	−0 44.3	0 20 42.56	+8 32 5.1	8.770_n	0.646	3	8,8	Fn.	26-inch.
11	11 10 50	−1 12.15	−5 23.9	0 20 41.26	+8 31 55.7	8.323	0.646	4	25,5	Fn.	" "
11	11 48 12	−1 41.87	−6 33.5	0 20 40.15	+8 31 48.8	8.982	0.648	5	24,5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 28. m s	′ ″	
1	0 24 10.91	+3.08	+9 7 22.5	+18.6	Leipzig II, A. G. 140.....	+2 12.1	+14 39.4	Seeing good.
2	0 24 56.26	+3.08	+9 10 23.5	+18.6	" " " 145.....	+2 12.1	+14 40.2	Seeing good.
3	0 20 25.38	+3.08	+8 32 30.3	+19.1	" " " 116.....	+2 10.4	+14 34.7	
4	0 21 50.33	+3.08	+8 37 0.5	+19.1	" " " 126.....	+2 10.4	+14 34.5	
5	0 22 18.94	+3.08	+8 38 3.2	+19.1	" " " 132.....	+2 10.5	+14 36.3	

(212) MEDEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 4	11 49 37	−1 18.90	+1 39.9	0 20 44.61	+8 4 10.7	8.640	0.652	1	30,6	Fn.	26-inch
14	10 3 11	+1 2.47	−1 25.8	0 13 21.48	+7 21 31.2	8.884_n	0.662	2	25,5	Fn.	" "
14	10 39 35	+2 3.30	−8 31.5	0 13 20.36	+7 21 23.9	7.537_n	0.660	3	30,6	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 28. m s	′ ″	
1	0 22 0.45	+3.06	+8 2 12.1	+18.7	Leipzig II, A. G. 129.....	−2 59.9	−20 34.1	Seeing good.
2	0 12 15.97	+3.04	+7 22 37.6	+19.4	" " " 64.....	−2 57.2	−20 35.5	Seeing good.
3	0 11 14.02	+3.04	+7 29 35.9	+19.5	" " " 56.....	−2 57.2	−20 36.2	Seeing good.

(224) OCEANA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 4	13 54 22	+1 1.06	− 8 46.6	0 35 16.27	+6 54 46.2	9.400	0.678	1	25,5	Fn.	26-inch

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(224) OCEANA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 5	9 56 13	−2 38.29	+ 6 45.6	0 34 30.53	+6 51 41.8	9.296_n	0.674	2	22, 5	Fn.	26-inch
8	9 52 37	+0 35.43	+ 2 28.5	0 31 47.55	+6 40 45.4	9.250_n	0.674	3	30, 6	Fn.	" "
13	10 13 47	−0 9.21	− 3 40.9	0 27 23.45	+6 22 27.7	8.958_n	0.674	4	8, 8	Fn.	" "
22	12 33 57	+1 49.49	−10 42.9	0 20 12.28	+5 51 24.1	9.414	0.690	5	25, 5	Fn.	" "
22	12 45 16	−0 49.87	− 9 30.4	0 20 11.58	+5 51 26.4	9.444	0.691	6	5, 1	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	0 34 12.15	+3.06	+7 3 14.7	+18.1	Leipzig II, A. G. 205.....	....	.. ....	Seeing good.
2	0 37 5.76	+3.06	+6 44 38.1	+18.1	" " " 226.....	....	.. ....	Seeing poor.
3	0 31 9.06	+3.06	+6 37 58.4	+18.5	" " " 185.....	....	.. ....	Seeing excellent.
4	0 27 29.60	+3.06	+6 25 49.9	+18.7	" " " 158.....	....	.. ....	Seeing very poor.
5	0 18 19.76	+3.03	+6 1 47.7	+19.3	" " " 103.....	....	.. ....	
6	0 20 58.41	+3.04	+6 0 37.7	+19.1	" " " 122.....	....	.. ....	Clouds interrupt.

(225) HENRIETTA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 19	11 19 30	+0 5.44	+1 54.9	3 51 43.20	+2 48 33.8	8.902_n	0.713	1	10, 10	D.	26-inch
20	10 52 33	−1 0.07	+1 22.5	3 50 59.97	+2 43 24.9	9.091_n	0.714	2	35, 7	D.	" "
22	12 11 53	+2 42.50	+4 14.1	3 49 28.65	+2 32 53.3	8.721	0.715	3	29, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Veröff. 21.		
	h m s	s	° ′ ″	″		s	′	
1	3 51 33.65	+4.11	+2 46 33.1	+5.8	Albany, A. G. 1151.....	+4	−0.2	
2	3 51 55.92	+4.12	+2 41 56.7	+5.7	" " 1152.....	+5	−0.2	
3	3 46 42.02	+4.13	+2 28 33.2	+6.0	" " 1127.....	+5	−0.2	Seeing very unst.

(230) ATHAMANTIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 8	11 21 30	−1 38.16	+6 7.7	13 13 7.65	−18 11 39.3	8.988_n	0.864	1	30, 6	Hd.	12-inch
8	11 21 30	−3 28.89	+2 31.3	13 13 7.60	−18 11 41.2	8.988_n	0.864	2	30, 6	Hd.	" "

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(230) ATHAMANTIS—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 10	10 39 4	−1 38.97	−6 53.7	13 11 20.97	−17 55 46.5	9.213$_n$	0.858	3	30, 6	Hd.	12-inch
17	10 34 15	+1 44.32	+0 9.9	13 5 7.07	−16 55 21.1	9.019$_n$	0.858	4	30, 6	Hd.	" "
18	9 37 7	−0 2.77	−3 41.5	13 4 17.03	−16 46 44.5	9.317$_n$	0.848	5	30, 10	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	13 14 43.17	+2.64	−18 17 35.6	−11.4	Washington, A. G. 5046.....	....	.. ....	
2	13 16 33.85	+2.64	−18 14 1.1	−11.4	" " 5056.....	....	.. ....	
3	13 12 57.30	+2.64	−17 48 41.1	−11.7	" " 5037.....	....	.. ....	
4	13 3 20.11	+2.64	−16 55 18.0	−13.0	" " 4997.....	....	.. ....	
5	13 4 17.16	+2.64	−16 42 50.0	−13.0	" " 5003.....	....	.. ....	

(234) BARBARA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
July 8	14 14 10	−0 53.23	−4 40.3	19 1 44.57	−2 43 15.9	9.416	0.760	1	19, 4	Fn.	12-inch
8	14 26 39	−1 4.41	−7 28.8	19 1 44.22	−2 43 22.7	9.448	0.760	2	20, 4	Fn.	" "
8	14 42 28	−1 34.64	−7 15.8	19 1 43.48	−2 43 28.5	9.484	0.758	3	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	19 2 35.29	+2.51	−2 38 48.2	+12.6	Straszburg, A. G. 6481.....	....	.. ....	Seeing excellent.
2	19 2 46.12	+2.51	−2 36 6.5	+12.6	" " 6485.....	....	.. ....	Seeing excellent.
3	19 3 15.61	+2.51	−2 36 25.3	+12.6	" " 6489.....	....	.. ....	Seeing excellent.

(236) HONORIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
May 4	11 55 58	+2 9.31	−4 32.4	14 19 6.31	−7 43 30.8	8.691	0.804	1	15, 8	D.	26-inch
5	10 57 51	+1 24.18	+1 33.9	14 18 21.18	−7 37 24.5	8.767$_n$	0.803	2	9, 6	D.	" "
11	13 8 44	+0 51.89	−1 21.8	14 13 45.96	−7 6 42.5	9.395	0.790	3	18, 10	D.	" "

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(236) HONORIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	14 16 54.36	+2.64	−7 38 50.3	−8.1	Wien-Ottakring, A. G. 5081	....	.. ....	
2	14 16 54.36	+2.64	−7 38 50.3	−8.1	" " " 5081.....	....	.. ....	
3	14 12 51.42	+2.65	−7 5 12.7	−8.0	" " " 5060.....	....	.. ....	

(241) GERMANIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
July 26	10 36 1	−0 9.34	− 1 18.3	19 34 1.75	−18 9 21.6	8.908_n	0.865	1	25,5	F.	9.6-inch
Aug. 7	10 45 13	+0 43.37	+12 59.2	19 25 11.07	−18 13 44.8	8.746	0.866	2	12,3	F.	" "
1904											
May 7	12 26 24	+2 2.31	− 3 34.9	15 34 44.88	−24 23 58.1	8.177_n	0.894	3	30,6	D.	26-inch
12	11 57 54	+3 8.48	+ 4 3.1	15 30 39.24	−24 5 45.9	8.366_n	0.893	4	30,6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 3225. s	′ ″	
1	19 34 7.68	+3.41	−18 8 3.1	−0.2	Algiers, A. G. Zones	−1.97	−0 6.7	
2	19 24 24.25	+3.45	−18 26 43.0	−1.0	" " "	....	.. ....	
						B. J. 1906.		
3	15 32 39.91	+2.66	−24 20 21.5	−1.7	Cordoba Gen. Cat. 21184.....	−2.01	+0 5.7	
4	15 27 28.05	+2.71	−24 9 47.6	−1.4	" " " 21062	−1.81	+0 5.0	Star double; used pr. component.

(245) VERA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 26	11 16 38	−1 45.96	−5 14.5	8 38 53.13	+25 34 4.4	9.125_n	0.323	1	15,3	Fn.	26-inch
27	9 56 11	−2 32.55	−3 49.3	8 38 1.35	+25 37 35.4	9.455_n	0.399	2	25,5	Hd.	" "
Feb. 6	8 33 43	−0 42.90	−0 34.7	8 29 10.99	+26 9 36.6	9.539_n	0.434	3	25,5	Hd.	" "
8	9 55 29	+0 30.52	−0 51.6	8 27 27.34	+26 14 53.2	9.240_n	0.318	4	25,5	Hd.	" "
11	9 10 32	−0 18.69	+1 37.3	8 25 3.60	+26 21 36.0	9.374_n	0.348	5	25,5	Hd.	" "
12	10 43 45	−1 22.80	−4 40.8	8 24 13.95	+26 23 47.1	8.438_n	0.274	6	25,5	Fn.	" "
15	8 39 58	−2 11.38	−1 7.6	8 22 4.02	+26 28 58.5	9.415_n	0.360	7	25,5	Hd.	" "
18	7 50 38	−0 1.31	−3 7.8	8 20 0.94	+26 33 13.0	9.512_n	0.407	8	25,5	Fn.	" "
20	12 20 20	+2 59.55	−1 26.4	8 18 36.80	+26 35 41.8	9.413	0.356	9	20,4	Hd.	" "
25	8 23 10	+1 25.08	−0 31.0	8 15 53.40	+26 39 10.6	9.308_n	0.321	10	25,5	Hd.	" "
27	8 28 57	+1 36.47	+2 24.6	8 14 55.03	+26 39 53.2	9.238_n	0.305	11	25,5	Hd.	" "

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(245) VERA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						A. N. 4183.		
	h m s	s	° ′ ″	″		s	′ ″	
1	8 40 38.44	+0.65	+25 39 25.6	−6.7	Camb., Eng., A. G. 4685.....	0.0	−0 1	
2	8 40 33.24	+0.66	+25 41 31.3	−6.6	" " " 4683.....	−0.2	−0 2	
3	8 29 53.15	+0.74	+26 10 17.3	−6.0	" " " 4595.....	+0.1	0 0	Est. mag. 11.5.
4	8 26 56.07	+0.75	+26 15 50.7	−5.9	" " " 4570.....	+0.2	−0 1	
5	8 25 21.53	+0.76	+26 20 4.4	−5.7	" " " 4559.....	+0.1	−0 1	
6	8 25 35.99	+0.76	+26 28 33.5	−5.6	" " " 4560.....	0.0	0 0	
7	8 24 14.64	+0.76	+26 30 11.4	−5.3	" " " 4555.....	+0.1	0 0	Seeing excellent; est. mag. 11.5
8	8 20 1.51	+0.74	+26 36 25.8	−5.0	" " " 4523.....	−0.2	−0 1	
9	8 15 36.53	+0.72	+26 37 13.1	−4.9	" " " 4491.....	−0.1	0 0	
10	8 14 27.63	+0.69	+26 39 46.2	−4.6	" " " 4483.....	0.0	−0 1	
11	8 13 17.89	+0.67	+26 37 32.9	−4.3	" " " 4471.....	+0.1	−0 1	Ast. faint because of moonlight.

(247) EUKRATE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 8	9 54 17	−3 1.05	+0 3.8	7 51 21.18	+62 28 32.2	9.809_n	0.317_n	1	20, 4	F.	12-inch
13	7 11 24	+4 25.36	+7 44.7	7 41 41.78	+62 10 18.0	9.974_n	9.956	2	20, 4	F.	" "
20	11 20 28	−4 22.88	+2 3.4	7 28 26.84	+61 21 12.0	8.377_n	0.529_n	3	4, 1	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						B. J. 1900.		
	h m s	s	° ′ ″	″		s	′ ″	
1	7 54 17.29	+4.94	+62 28 33.0	−4.6	Hels.-Gotha, A. G. 5340.....	−0.87	+0 7.0	
2	7 37 11.44	+4.98	+62 2 34.8	−1.5	" " " 5204.....	−1.81	+0 3.5	
3	7 32 44.74	+4.98	+61 19 10.6	−2.0	" " " 5170.....	−1.40	−0 10.1	

(257) SILESIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 31	10 18 7	+1 51.12	+0 48.0	2 16 58.08	+13 52 43.5	9.206_n	0.579	1	25, 5	Fn.	26-inch
31	10 38 58	−2 41.04	+4 30.2	2 16 57.39	+13 52 41.7	9.078_n	0.574	2	25, 5	Fn.	" "
Nov. 2	10 37 12	+2 35.88	−1 36.0	2 15 16.50	+13 47 5.5	9.018_n	0.574	3	25, 5	Hd.	" "
2	11 3 19	+0 8.47	−4 55.2	2 15 15.45	+13 47 0.5	8.708_n	0.570	4	10, 10	Hd.	" "

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(257) SILESIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	2 15 3.54	+3.42	+13 51 42.8	+12.7	Leipzig I, A. G. 680.....	....	.. ....	
2	2 19 35.00	+3.43	+13 47 59.1	+12.4	" " " 698.....	....	.. ....	
3	2 12 37.19	+3.43	+13 48 28.5	+13.0	" " " 671.....	....	.. ....	
4	2 15 3.54	+3.44	+13 51 42.8	+12.9	" " " 680.....	....	.. ....	

(260) HUBERTA=[1906 WO].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 21	11 53 22	−2 52.30	− 2 27.1	3 41 45.28	+11 7 15.6	8.412	0.610	1	25, 5	Hd.	26-inch
22	9 50 15	−0 39.29	+10 55.4	3 41 3.78	+11 4 40.2	9.318_n	0.625	2	25, 5	Fn.	" "
23	12 40 24	+0 43.30	+10 58.2	3 40 13.32	+11 1 33.4	9.142	0.618	3	25, 5	Hd.	" "
24	10 22 1	−3 37.27	+ 7 42.2	3 39 32.88	+10 59 5.0	9.114_n	0.617	4	20, 4	Fn.	" "
25	10 14 35	−0 41.58	+ 5 53.8	3 38 48.45	+10 56 28.9	9.132_n	0.618	5	25, 5	Hd.	" "
Dec. 4	10 7 56	+2 27.92	− 7 41.0	3 32 26.74	+10 36 21.0	8.817_n	0.619	6	24, 5	Fn.	" "
7	8 16 20	+0 34.22	−12 42.5	3 30 33.05	+10 31 19.4	9.399_n	0.639	7	30, 5	Hd.	" "
11	8 55 28	+0 44.80	+ 0 37.8	3 28 7.34	+10 25 45.8	9.164_n	0.626	8	25, 5	Fn.	" "
23	7 53 41	−2 54.89	+10 47.3	3 22 28.00	+10 19 6.5	9.212_n	0.629	9	24, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 4157. s	′ ″	
1	3 44 34.26	+3.32	+11 9 36.4	+6.3	Paris 4499	+0.06	+0 1.7	Est. mag. 12.6; Leipzig I, A. G. 1116 is to be corrected by −3′ in δ.
2	3 41 39.75	+3.32	+10 53 38.2	+6.6	Leipzig I, A. G. 1094.....	−0.09	+0 0.3	Est. mag. 12.7.
3	3 39 26.69	+3.33	+10 50 28.5	+6.7	" " " 1083.....	+0.04	0 0.0	
4	3 43 6.81	+3.34	+10 51 16.4	+6.4	" " " 1104.....	+0.08	−0 1.6	
5	3 39 26.69	+3.34	+10 50 28.5	+6.6	" " " 1083.....	−0.02	−0 0.2	
6	3 29 55.44	+3.38	+10 43 55.1	+6.9	" " " 1045.....	+0.23	+0 0.7	
7	3 29 55.44	+3.39	+10 43 55.1	+6.8	" " " 1045.....	+0.09	−0 0.6	
8	3 27 19.16	+3.38	+10 25 1.2	+6.8	" " " 1037.....	0.00	−0 1.4	
9	3 25 19.53	+3.36	+10 8 12.8	+6.4	Leipzig II, A. G. 1287.....	+0.03	−0 0.7	Seeing bad; ast. very faint; extremely difficult.

(263) DRESDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 24	11 6 32	−4 7.79	+1 9.0	4 52 25.42	+21 12 12.7	8.731	0.425	1	20, 4	Hd.	26-inch

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(263) DRESDA—Continued.

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 56 29.30	+3.91	+21 11 3.3	+0.4	Berlin B, A. G. 1604.....	....	.. ....	Seeing good; est. mag. 12.5.

(268) ADOREA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 22	15 16 25	−1 16.13	+3 49.0	5 13 50.07	+20 47 51.1	9.634	0.600	1	25, 5	Fn.	26-inch
24	9 40 27	−2 47.30	+3 18.3	5 12 18.91	+20 47 20.3	9.228_n	0.456	2	20, 4	Hd.	" "
1907											
Jan. 4	10 11 40	−0 47.31	−3 39.9	5 3 40.41	+20 45 16.4	7.691	0.433	3	25, 5	Hd.	" "
5	8 27 39	−1 25.68	−3 43.7	5 3 2.04	+20 45 12.6	9.304_n	0.467	4	25, 5	Fn.	" "
10	10 36 44	+2 2.23	−2 37.1	4 59 49.16	+20 45 18.2	9.065	0.444	5	25, 5	Hd.	" "
21	9 46 21	+0 9.04	+1 13.2	4 54 51.85	+20 48 26.8	9.047	0.442	6	29, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	5 15 2.29	+3.91	+20 44 3.5	−1.4	Berlin B, A. G. 1714.....	....	.. ....	Est. mag. 11.5.
2	5 15 2.29	+3.92	+20 44 3.5	−1.5	" " " 1714.....	....	.. ....	Good obs'n; est. mag. 11.5.
3	5 4 27.34	+0.38	+20 49 1.5	−5.2	" " " 1656.....	....	.. ....	Seeing good.
4	5 4 27.34	+0.38	+20 49 1.5	−5.2	" " " 1656.....	....	.. ....	
5	4 57 46.57	+0.36	+20 48 0.5	−5.2	" " " 1616.....	....	.. ....	Seeing good; est. mag. 12.0.
6	4 54 42.52	+0.29	+20 47 18.6	−5.0	" " " 1594.....	....	.. ....	Seeing fair.

(270) ANAHITA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
July 18	11 39 3	+2 42.50	+7 50.3	20 38 21.58	−14 43 10.5	9.188_n	0.843	1	29, 6	Hd.	12-inch
21	11 33 14	+0 1.98	+3 49.7	20 35 41.10	−14 47 10.8	9.137_n	0.844	2	29, 6	Hd.	" "
22	10 41 13	+1 24.22	+4 40.8	20 34 47.92	−14 48 37.3	9.356_n	0.836	3	30, 6	Hd.	" "
23	10 54 40	+0 27.43	+3 2.4	20 33 51.14	−14 50 15.7	9.286_n	0.840	4	24, 8	Hd.	" "
24	11 14 50	+3 29.35	−5 50.6	20 32 53.22	−14 51 58.8	9.160_n	0.844	5	25, 5	Hd.	" "
Aug. 7	10 7 6	−1 9.86	−3 35.5	20 19 31.35	−15 21 1.6	9.158_n	0.847	6	30, 6	Hd.	" "
7	10 28 43	+0 50.06	−3 33.8	20 19 30.58	−15 21 3.0	9.002_n	0.850	7	30, 6	Hd.	" "
9	10 15 26	+1 42.94	−7 1.2	20 17 44.34	−15 25 35.3	9.032_n	0.850	8	30, 6	Hd.	" "
9	10 33 23	−0 1.70	+7 39.8	20 17 43.71	−15 25 36.7	8.852_n	0.851	9	30, 6	Hd.	" "
11	10 59 44	+1 17.72	−7 2.1	20 16 0.42	−15 30 11.7	7.483	0.853	10	30, 6	Hd.	" "
1905											
Jan. 30	9 44 43	+2 12.38	+6 29.9	8 28 33.31	+15 51 34.6	9.392_n	0.567	11	30, 6	D.	26-inch
Feb. 4	11 52 6	+0 33.76	−2 14.6	8 22 57.38	+16 9 37.9	8.761	0.530	12	30, 6	D.	" "
7	11 31 42	−2 42.74	−0 45.6	8 19 49.61	+16 19 53.3	8.666	0.526	13	30, 6	D.	" "

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(270) ANAHITA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	20 35 35.74	+3.34	−14 51 20.7	+19.9	Radcliffe 1890, 5564	−1.16	−0 1.0	
2	20 35 35.74	+3.38	−14 51 20.7	+20.2	" " 5564	−1.25	−0 1.9	
3	20 33 20.31	+3.39	−14 53 38.3	+20.2	Washington, A. G. 7770	−1.18	−0 1.0	
4	20 33 20.31	+3.40	−14 53 38.3	+20.2	" " 7770	−1.28	−0 2.4	
5	20 29 20.44	+3.43	−14 46 28.4	+20.2	" " 7747	−1.54	−0 3.0	
6	20 20 37.66	+3.55	−15 17 46.4	+20.3	Radcliffe 1890, 5487	−2.02	−0 3.2	Seeing bad; unst. and woolly.
7	20 18 36.97	+3.55	−15 17 49.4	+20.2	Washington, A. G. 7672	−1.92	−0 2.6	Seeing bad: unst. and
8	20 15 57.84	+3.56	−15 18 54.1	+20.0	" " 7659	−2.10	−0 3.5	woolly.
9	20 17 41.85	+3.56	−15 33 36.6	+20.1	" " 7667	−2.04	−0 3.1	
10	20 14 39.14	+3.56	−15 23 29.5	+19.9	" " 7642	−2.24	−0 3.9	Seeing unst. at times.
						B. J. 1907.		
11	8 26 19.68	+1.25	+15 45 16.7	−12.0	Berlin A, A. G. 3378	+2.14	−0 8.8	Seeing fair but fuzzy.
12	8 22 22.34	+1.28	+16 12 4.6	−12.1	" " " 3342	+1.96	−0 8.4	Seeing poor.
13	8 22 31.07	+1.28	+16 20 50.9	−12.0	" " " 3345	+2.17	−0 7.6	Seeing bad.

(271) PENTHESILEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 15	10 57 46	+5 8.46	−0 19.2	4 10 54.28	+26 40 57.2	9.322_n	0.323	1	30, 7	D.	26-inch
26	12 35 0	+0 21.89	+0 6.7	4 0 34.63	+26 17 28.0	9.078	0.296	2	10, 10	D.	" "
26	13 14 38	−4 27.07	+3 40.0	4 0 33.26	+26 17 26.0	9.308	0.332	3	30, 6	D.	" "
26	13 58 49	+2 23.79	+3 16.7	4 0 31.56	+26 17 20.4	9.462	0.386	4	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 21. m s	′	
1	4 5 41.00	+4.82	+26 41 12.8	+3.6	Camb., Eng., A. G. 2011	+1 26	+3.6	
2	4 0 7.80	+4.94	+26 17 16.4	+4.9	" " " 1987	+1 25	+3.9	Seeing unst.; star has a faint n. companion.
3	4 4 55.39	+4.94	+26 13 41.8	+4.2	" " " 2008	+1 25	+3.9	Seeing unst.
4	3 58 2.83	+4.94	+26 13 58.6	+5.1	" " " 1972	+1 25	+3.9	Seeing unst.

(276) ADELHEID.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
June 8	10 36 26	+3 46.12	−1 37.7	16 32 36.65	−1 45 51.2	8.985_n	0.756	1	20, 4	Hd.	26-inch
8	10 54 23	−2 57.94	−6 32.4	16 32 36.07	−1 45 49.0	8.787_n	0.756	2	20, 4	Hd.	" "

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(276) ADELHEID—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 4015. m s	′	
1	16 28 48.34	+2.19	−1 44 17.6	+4.1	Nicolajew, A.G. 4166.....	−2 47	−8.2	Seeing poor.
2	16 35 31.81	+2.20	−1 39 21.0	+4.4	" " 4185.....	−2 47	−8.3	Seeing poor.

(277) ELVIRA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1899	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 7	13 39 24	+4 27.21	− 8 11.1	21 23 12.10	−13 26 31.6	9.219	0.835	1	20, 10	See	12-inch
7	14 6 28	+4 26.16	− 8 16.4	21 23 11.05	−13 26 36.9	9.335	0.830	2	20, 9	See	" "
8	11 29 55	+3 42.41	−11 40.6	21 22 27.31	−13 30 1.1	8.940_n	0.840	3	20, 10	See	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 10. s	′	
1	21 18 40.38	+4.51	−13 18 41.7	+21.2	Hedrick's Zodiacal Cat. 1427.....	+18	+1.6	
2	21 18 40.38	+4.51	−13 18 41.7	+21.2	" " " 1427.....	+18	+1.5	
3	21 18 40.38	+4.52	−13 18 41.7	+21.2	" " " 1427.....	+18	+1.5	

(278) PAULINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 10	11 41 2	−1 52.05	+5 2.2	13 42 36.07	−1 22 45.7	8.974_n	0.753	1	25, 5	Fn.	26-inch
16	13 25 50	+1 53.95	−2 7.8	13 37 10.35	−1 10 33.7	9.227	0.750	2	25, 5	Fn.	" "
16	13 45 52	−2 2.11	−6 27.6	13 37 9.42	−1 10 33.1	9.312	0.750	3	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 29. s	′	
1	13 44 26.77	+1.35	−1 27 42.7	−5.2	Nicolajew, A. G. 3643.....	+4	−0.3	

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(278) PAULINA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C.		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 29.		
2	13 35 15.01	+1.39	−1 8 20.5	−5.4	Nicolajew, A. G. 3623.....	s +5	′ −0.4	
3	13 39 10.14	+1.39	−1 4 0.1	−5.4	" " 3628.....	+5	−0.4	

(287) NEPHTHYS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
July 25	12 10 32	+3 18.34	−7 28.1	19 59 31.49	−14 2 52.6	8.769	0.844	1	10, 2	F.	12-inch
Aug. 3	11 41 42	−0 46.21	−0 54.0	19 51 34.75	−15 16 8.2	8.948	0.850	2	20, 4	F.	" "
6	11 13 30	−2 56.66	+5 32.8	19 49 10.66	−15 40 17.4	8.779	0.853	3	5, 1	F.	" "
11	11 46 47	−3 16.65	−9 4.5	19 45 33.46	−16 20 3.5	9.241	0.849	4	10, 2	F.	" "
19	9 43 33	−0 8.96	+0 53.1	19 41 5.64	−17 18 59.9	7.569_n	0.863	5	20, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C.		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		A. N. 3361.		
1	19 56 9.08	+4.07	−13 55 29.9	+5.4	Hedrick's Zodiacal Cat. 1328.....	s +0.68	′ ″ −0 3.6	
2	19 52 16.83	+4.13	−15 15 19.5	+5.3	Washington, A. G. 7502.....	+1.07	−0 4.0	
3	19 52 3.17	+4.15	−15 46 1.5	+5.3	Hedrick's Zodiacal Cat. 1323.....	+0.66	−0 4.3	
4	19 48 45.93	+4.18	−16 11 3.9	+4.9	Washington, A. G. 7482.....	+1.55	−0 1.3	
5	19 41 10.41	+4.19	−17 19 57.1	+4.1	" " 7439.....	+2.32	+0 5.0	

(288) GLAUKE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
May 4	11 35 1	+0 23.91	−4 36.0	14 45 32.69	−7 52 19.6	8.589_n	0.805	1	10, 2	F.	9.6-inch
18	12 21 52	−0 26.60	+3 54.8	14 34 51.47	−7 23 13.8	9.262	0.797	2	13, 3	F.	" "

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(306) UNITAS—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 11	11 47 36	+2 18.75	+5 57.3	23 7 39.07	−11 53 58.1	6.022	0.832	2	30, 6	Hd.	12-inch
12	10 43 42	+1 34.15	−2 57.9	23 6 54.47	−12 2 53.3	9.078$_n$	0.830	3	30, 6	Hd.	" "
13	9 37 51	+2 50.24	−4 37.7	23 6 10.13	−12 11 38.6	9.371$_n$	0.821	4	30, 6	Hd.	" "
14	9 10 15	+3 1.72	−0 58.5	23 5 25.01	−12 20 27.4	9.439$_n$	0.817	5	30, 6	Hd.	" "
15	8 33 8	+0 2.76	+4 55.6	23 4 40.72	−12 29 1.9	9.513$_n$	0.808	6	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1900. s	′ ″	
1	8 53 41.10	+2.92	+17 3 37.7	− 8.6	Berlin A, A. G. 3620.....	+0.28	+0 1.4	
2	23 5 16.80	+3.52	−12 0 19.7	+24.3	Camb., U. S., A. G. Zones.....	....	.. ....	Seeing fine.
3	23 5 16.80	+3.52	−12 0 19.7	+24.3	" " " "	....	.. ....	Seeing fair; good obs'n.
4	23 3 16.37	+3.52	−12 7 25.2	+24.3	" " " "	....	.. ....	Seeing quite unst.
5	23 2 19.76	+3.53	−12 19 53.2	+24.3	" " " "	....	.. ....	Seeing fine.
6	23 4 34.43	+3.53	−12 34 21.8	+24.3	" " " "	....	.. ....	Seeing good.

(307) NIKE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 1	11 24 39	−0 34.58	+ 3 54.1	2 39 48.25	+6 12 22.4	8.778$_n$	0.675	1	25, 5	See	12-inch
6	11 21 55	+0 28.52	+18 36.1	2 35 29.59	+5 59 37.2	8.253$_n$	0.677	2	20, 5	See	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 10. s	′	
1	2 40 17.90	+4.93	+6 8 5.1	+23.2	Leipzig II, A. G. 1014.....	+35	+4.8	
2	2 34 56.09	+4.98	+5 40 37.7	+23.4	" " " 984	+36	+4.8	

(313) CHALDAEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 24	11 8 57	−0 49.82	+3 2.5	9 37 17.51	−1 28 21.9	9.408$_n$	0.752	1	29, 6	Hd.	12-inch

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(313) CHALDAEA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 25	11 58 6	−0 25.57	−2 23.3	9 36 40.06	−1 21 32.6	9.206$_n$	0.752	2	30, 6	Hd.	12-inch
25	11 59 10	+0 59.44	−3 41.6	9 36 40.05	−1 21 28.9	9.200$_n$	0.752	3	30, 6	Hd.	" "
30	11 0 4	−1 35.64	−0 39.0	9 33 23.21	−0 43 15.7	9.350$_n$	0.746	4	28, 6	Hd.	" "
Feb. 3	11 14 8	+0 43.66	−2 24.3	9 30 27.16	−0 6 13.1	9.218$_n$	0.741	5	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		B. J. 1906. s	′ ″	
1	9 38 5.81	+1.52	−1 31 13.1	−11.3	Nicolajew, A. G. 2919.....	+0.58	+0 2.6	Seeing very bad; woolly.
2	9 37 4.09	+1.54	−1 18 57.8	−11.5	" " 2916.....	+0.67	+0 0.5	Seeing good.
3	9 35 39.07	+1.54	−1 17 35.8	−11.5	" " 2912.....	+0.68	+0 3.9	Seeing good.
4	9 34 57.25	+1.60	−0 42 24.2	−12.5	Newcomb's Fund. Cat. 617.....	+0.76	+0 2.0	Hazy; ast. very faint.
5	9 29 41.85	+1.65	−0 3 35.6	−13.2	Nicolajew, A. G. 2891.....	+0.71	+0 0.1	Seeing very bad; unst. and diffuse.

(317) ROXANE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 16	10 16 56	−1 13.60	+6 22.6	12 56 56.81	−3 39 57.3	9.079$_n$	0.772	1	35, 7	D.	26-inch
18	12 4 47	+1 5.27	−2 36.0	12 55 4.78	−3 27 37.3	9.054	0.770	2	30, 6	D.	" "
18	12 22 23	−2 27.58	+1 40.0	12 55 4.18	−3 27 32.7	9.167	0.769	3	30, 6	D.	" "
18	12 42 41	−3 2.33	+2 27.3	12 55 3.27	−3 27 27.3	9.267	0.768	4	18, 4	D.	" "
20	13 44 58	−1 28.47	+2 4.8	12 53 16.29	−3 15 44.7	9.485	0.762	5	40, 8	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 22.* m s	′	
1	12 58 8.36	+2.05	−3 46 9.8	−10.1	Straszburg, A. G. 4744.....	−2 8	+12.3	Seeing good.
2	12 53 57.47	+2.04	−3 24 51.1	−10.2	" " 4725.....	−2 18	+13.2	
3	12 57 29.71	+2.05	−3 29 2.6	−10.1	" " 4735.....	−2 18	+13.2	
4	12 58 3.55	+2.05	−3 29 44.5	−10.1	" " 4743.....	−2 18	+13.2	
5	12 54 42.72	+2.04	−3 17 39.3	−10.2	" " 4729.....	−2 27	+14.1	Seeing unst.; windy.

* Ephemeris in Veröff. 22 is erroneously computed. See note in A. N. 165, p. 175.

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(322) PHAEO.

DATE	WASHINGTON MEAN TIME	PLANET STAR $\Delta\alpha$	PLANET STAR $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\delta$ α	LOG $p\delta$ δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1901	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 19	16 15 6	1 11 29	3 35 0	4 49 43.82	−23 5 17.6	9.809$_n$	0.437	1	25.5	Fr.	20-inch
29	16 51 39	1 49 57	4 15 4	4 49 43.24	−23 5 11.3	9.341$_n$	0.422	2	25.5	Fr.	
Dec. 4	0 49 16	0 22.22	4 45 5	4 44 42.73	−22 36 31.1	9.432$_n$	0.458	3	25.5	Fr.	
4	16 5 12	1 1 59	11 21 5	4 44 41.71	−22 36 25.9	9.354$_n$	0.436	4	25.5	Fr.	"
4	16 22 28	1 32 59	0 30 2	4 44 40.35	−22 36 21.7	9.274$_n$	0.422	5	20.4	Fr.	"

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR

STAR	α	REDUCTION TO APP. PLACE	δ	REDUCTION TO APP. PLACE	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	″	
					Veröff. 23.			
1	4 50 50.88	−4.015	+22 8 53.8	+1.2	Berlin B. A. G. 1577	−56	−2.0	
2	4 47 50.14	−4.014	+22 9 28.7	0.8	1549	−56	−2.1	
3	4 45 0.87	−4.018	+22 41 55.8	0.3	1536	−55	−2.2	
4	4 45 49.01	−4.019	+22 47 47.8	0.4	1538	−55	−2.2	
5	4 48 0.16	−4.018	+22 36 52.5	0.6	1552	−55	−2.2	

(324) BAMBERGA.

DATE	WASHINGTON MEAN TIME	PLANET STAR $\Delta\alpha$	PLANET STAR $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\delta$ α	LOG $p\delta$ δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1901	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 7	11 50 41	1 17 14	1 14 2	22 26 54.29	12 1 59.3	8.840$_n$	0.832	1	25,5	Hd.	12-inch
7	11 58 45	1 11 59	1 7 7	22 26 52.65	12 1 51.3	8.508$_n$	0.833	2	25,5	Hd.	" "
9	11 18 1	1 56 05	0 4 5	22 25 22.63	11 50 54.6	9.360$_n$	0.820	3	30,6	Hd.	" "
11	11 41 1	1 15 09	1 0 4	22 23 42.25	11 39 28.1	9.274$_n$	0.823	4	30,6	Hd.	" "
11	11 57 40	1 8 13	1 3 1	22 23 40.96	11 39 20.4	9.136$_n$	0.827	5	30,6	Hd.	" "
11	10 43 58	1 14 00	0 24 2	22 14 6.32	10 42 6.4	9.268$_n$	0.818	6	30,6	Hd.	" "
11	10 51 17	1 17 08	0 57 3	22 14 3.08	10 36 10.0	9.202$_n$	0.819	7	30,6	Hd.	" "
14	10 7 14	1 1 07	1 46 4	22 10 58.11	10 24 32.5	9.348$_n$	0.812	8	30,6	Hd.	" "
1901											
Aug. 6	11 10 49	1 7 30	1 18 0	12 46 20.76	17 46 0.4	8.894$_n$	0.863	9	25,5	Hd.	26-inch
6	11 14 17	1 20 82	1 46 1	12 46 20.38	17 45 57.9	8.698$_n$	0.864	10	5,1	Hd.	" "
10	10 13 51	0 13 03	1 26 8	12 42 53.29	17 30 10.0	9.129$_n$	0.859	11	25,5	Hd.	" "
13	10 1 14	0 30 80	1 32.8	12 40 19.14	17 17 26.5	9.164$_n$	0.857	12	25,5	Hd.	" "
13	11 13 11	1 28 14	1 51 0	12 38 35.02	17 8 21.6	8.633	0.861	13	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR	α	REDUCTION TO APP. PLACE	δ	REDUCTION TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	″	
					A. N. 3868.			
1	11 58 41 80	1 1 12	12 1 0 6	1 23 8	Camb., U. S., A. G. Zones	−4	−0.7	
2	11 58 37 20	1 1 12	12 1 2 1	1 23 8	" " " "	−4	−0.6	
3	11 58 11 32	1 1 11	11 51 53 7	1 23 6	" " " "	−4	−0.5	
4	11 58 31 01	1 1 11	11 49 1 1	1 23 6	" " " "	−3	−0.6	Seeing very unst. at times.

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(324) BAMBERGA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′	
5	22 21 32.49	+3.34	−11 43 16.1	+23.6	Radcliffe 1890, 6026.....	−3	−0.5	Seeing very unst. at times.
6	22 15 17.76	+3.46	−10 42 54.7	+24.1	Camb., U. S., A. G. Zones.....	−4	−0.6	Seeing unst.
7	22 10 21.73	+3.47	−10 35 36.8	+24.1	" " " "	−3	−0.6	Seeing fair.
8	22 9 52.75	+3.49	−10 30 43.0	+24.1	" " " "	−4	−0.5	Seeing poor; unst.
						Veröff. 29.		
9	12 47 26.46	+1.50	−17 41 15.3	− 7.1	Washington, A. G. 4916.....	−2	+0.3	Seeing fair.
10	12 49 48.69	+1.51	−17 50 37.1	− 7.0	" " 4928.....	−2	+0.3	Seeing fair; clouds interrupt.
11	12 43 7.42	+1.52	−17 34 29.2	− 7.6	" " 4891.....	−2	+0.3	Seeing poor.
12	12 39 46.74	+1.51	−17 15 45.9	− 8.1	" " 4878.....	−2	+0.4	Seeing bad.
13	12 35 5.07	+1.51	−17 10 4.0	− 8.6	" " 4854.....	−2	+0.4	Seeing good.

(326) TAMARA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 2	10 12 23	+0 34.21	+3 53.6	0 53 51.82	−1 10 53.5	7.842	0.751	1	25, 5	Hd.	26-inch
2	10 12 23	−0 45.72	−0 35.2	0 53 51.78	−1 10 52.1	7.842	0.751	2	25, 5	Hd.	" "
4	9 24 36	+0 29.33	−5 35.6	0 51 52.44	−0 58 49.7	8.837_n	0.749	3	25, 5	Hd.	" "
4	9 33 56	−0 25.25	−0 31.6	0 51 52.11	−0 58 48.3	8.700_n	0.749	4	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	0 53 15.00	+2.61	−1 15 2.0	+14.9	Nicolajew, A. G. 180.....	....	.. ....	Seeing poor; est. mag. 11.5.
2	0 54 34.89	+2.61	−1 10 31.7	+14.8	" " 185.....	....	.. ....	Seeing poor.
3	0 51 20.51	+2.60	−0 53 28.9	+14.8	" " 171.....	....	.. ....	
4	0 52 14.76	+2.60	−0 58 31.5	+14.8	" " 176.....	....	.. ....	Est. mag. 11.5.

(332) SIRI.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 20	12 35 6	+1 24.76	−1 58.6	0 22 34.35	−0 7 24.6	8.216	0.741	1	30, 6	D.	26-inch
21	11 13 23	+3 19.88	−6 44.8	0 21 47.34	−0 11 33.1	9.132_n	0.742	2	30, 6	D.	" "
22	11 10 17	+1 11.54	+3 28.7	0 20 57.65	−0 15 48.6	9.122_n	0.743	3	30, 6	D.	" "

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(332) SIRI—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 24	9 57 4	+0 25.02	+0 21.6	0 19 19.74	−0 24 13.4	9.394$_n$	0.743	4	10, 10	D.	26-inch
24	12 10 26	+1 16.12	−3 25.0	0 19 14.82	−0 24 38.1	7.715	0.744	5	30, 6	D.	" "
1906											
Apr. 1	13 32 8	+0 43.64	−5 53.1	12 17 13.05	+0 10 8.6	9.338	0.739	6	25, 5	Fn.	26-inch
1	13 57 37	−0 49.55	−5 55.9	12 17 12.08	+0 10 13.1	9.417	0.739	7	25, 5	Fn.	" "
3	10 31 54	+0 12.98	−4 10.3	12 15 40.96	+0 18 20.5	9.056$_n$	0.737	8	25, 4	Fn.	" "
3	10 50 50	+1 37.60	−6 11.5	12 15 40.35	+0 18 24.7	8.884$_n$	0.737	9	25, 5	Fn.	" "
3	11 6 45	−1 10.65	−3 13.2	12 15 39.81	+0 18 29.6	8.654$_n$	0.737	10	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. m s	′	
1	0 21 6.01	+3.58	−0 5 48.6	+22.6	Nicolajew, A. G. 64	+1 5	+8.3	Seeing fine.
2	0 18 23.87	+3.59	−0 5 11.0	+22.7	" " 53	+1 5	+8.3	
3	0 19 42.51	+3.60	−0 19 40.0	+22.7	" " 60	+1 5	+8.3	
4	0 18 51.11	+3.61	−0 24 57.8	+22.8	" " 55	+1 6	+8.3	
5	0 17 55.09	+3.61	−0 21 35.9	+22.8	" " 52	+1 6	+8.3	
						Veröff. 29.		
6	12 16 28.14	+1.27	+0 16 9.4	− 7.7	Nicolajew, A. G. 3399	−0 4	+0.4	
7	12 18 0.36	+1.27	+0 16 16.7	− 7.7	" " 3403	−0 4	+0.4	
8	12 15 26.71	+1.27	+0 22 38.6	− 7.8	" " 3398	−0 3	+0.3	
9	12 14 1.48	+1.27	+0 24 44.0	− 7.8	" " 3393	−0 4	+0.3	
10	12 16 49.19	+1.27	+0 21 50.5	− 7.7	" " 3400	−0 3	+0.3	

(333) BADENIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 13	11 24 16	−0 26.28	−9 55.0	22 31 9.27	−10 56 59.4	8.630	0.824	1	10, 10	D.	26-inch
14	10 51 14	+1 49.38	+1 33.1	22 30 26.62	−10 59 16.3	8.180$_n$	0.826	2	30, 6	D.	" "
15	10 18 17	+1 7.34	−0 41.2	22 29 44.58	−11 1 30.6	8.860$_n$	0.826	3	29, 6	D.	" "
18	10 11 31	+2 5.85	+2 15.3	22 27 40.28	−11 7 48.2	8.765$_n$	0.826	4	29, 6	D.	" "
18	10 54 38	+1 37.57	−2 6.5	22 27 39.09	−11 7 54.2	8.470	0.827	5	28, 6	D.	" "
20	9 12 0	+0 48.86	−1 25.7	22 26 23.28	−11 11 29.3	9.198$_n$	0.822	6	30, 6	D.	" "
1906											
Mar. 22	13 1 22	+0 45.08	+4 40.2	10 40 15.13	+ 9 28 16.0	9.426	0.653	7	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. s	′	
1	22 31 32.02	+3.53	−10 47 28.8	+24.4	Camb., U. S., A. G. Zones	−26	−2.7	
2	22 28 33.71	+3.53	−11 1 13.8	+24.4	" " " "	−25	−2.7	
3	22 28 33.71	+3.53	−11 1 13.8	+24.4	" " " "	−24	−2.6	
4	22 25 30.90	+3.53	−11 10 27.8	+24.3	Newcomb's Fund. Cat. 1483	−25	−2.5	
5	22 25 58.00	+3.52	−11 6 12.0	+24.3	Camb., U. S., A. G. Zones	−25	−2.5	
6	22 25 30.90	+3.52	−11 10 27.8	+24.2	Newcomb's Fund. Cat. 1483	−25	−2.5	Seeing fine.

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(333) BADENIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 29.		
7	10 39 28.96	+1.09	+ 9 23 44.8	−9.0	Leipzig II, A. G. 5571.....	s −14	′ +1.4	Ast. very faint.

(334) CHICAGO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1901	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 5	10 19 56	+2 12.23	−0 38.6	3 21 0.48	+12 16 19.0	7.930_n	0.593	1	13, 3	D.	26-inch
6	10 8 45	−0 21.64	+6 42.0	3 20 26.39	+12 14 59.7	8.346_n	0.593	2	12, 14	D.	" "
6	10 29 23	−0 22.17	+6 40.6	3 20 25.86	+12 14 58.3	8.302	0.593	3	12, 10	D.	" "
1903											
Jan. 22	13 20 17	+2 39.06	+0 51.4	7 7 32.13	+19 58 17.7	9.441	0.511	4	19, 4	Fk.	26-inch
25	8 54 54	−0 25.02	+1 28.4	7 5 42.99	+20 4 2.3	9.366_n	0.491	5	8, 5	Fk.	" "
30	11 53 30	−0 4.28	+4 4.0	7 2 37.24	+20 14 6.6	9.261	0.471	6	10, 10	Fk.	" "
1904											
Mar. 9	9 55 9	−0 8.57	+4 19.5	10 45 21.58	+10 54 26.0	9.297_n	0.626	7	10, 10	D.	26-inch
9	10 38 2	+2 34.84	−2 12.0	10 45 20.68	+10 54 31.4	9.065_n	0.617	8	30, 6	D.	" "
13	11 38 14	−1 17.66	+8 14.3	10 42 56.85	+11 11 12.2	8.626	0.610	9	40, 8	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						A. N. 3741 (extrapolated).		
	h m s	s	° ′ ″	″		s	′ ″	
1	3 18 43.15	+5.10	+12 16 44.2	+13.4	Leipzig I, A. G. 999.....	+ 2.51	−0 29.7	Seeing fair.
2	3 20 42.92	+5.11	+12 8 4.6	+13.1	" " " 1008.....	+ 2.78	−0 31.4	
3	3 20 42.92	+5.11	+12 8 4.6	+13.1	" " " 1008.....	+ 2.76	−0 31.7	
						A. N. 3827.		
4	7 4 51.04	+2.03	+19 57 38.5	−12.2	Berlin B, A. G. 2816	− 8.18	−0 54.7	
5	7 6 5.96	+2.05	+20 2 46.2	−12.3	" " " 2824.....	− 8.22	−0 53.2	Hazy; ast. very dim.
6	7 2 39.47	+2.05	+20 10 14.7	−12.1	" " " 2798.....	− 7.90	−0 54.8	
						B. J. 1906.		
7	10 45 28.39	+1.76	+10 50 20.4	−13.9	Leipzig I, A. G. 4131.....	−20.79	+1 4.0	Seeing good.
8	10 42 44.08	+1.76	+10 56 57.3	−13.9	" " " 4115.....	−20.58	+1 1.9	Seeing good.
9	10 44 12.75	+1.76	+11 3 11.7	−13.8	Newcomb's Fund. Cat. 689.....	−20.56	+1 1.8	

(335) ROBERTA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
May 5	12 8 30	−1 17.45	−0 14.2	14 43 39.85	−6 30 15.0	8.518	0.795	1	15, 8	D.	26-inch

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(335) ROBERTA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
May 9	11 40 19	+4 9.98	− 7 39.7	14 40 4.97	− 6 10 18.9	8.176	0.792	2	16, 7	D.	26-inch
10	10 33 16	−0 5.36	− 7 3.8	14 39 13.99	− 6 5 49.1	9.038_n	0.791	3	10, 10	D.	" "
1904											
Nov. 15	11 24 27	+0 44.04	− 1 56.8	2 18 53.84	+ 5 39 28.6	8.951	0.682	4	30, 6	D.	26-inch
15	11 40 29	−2 23.18	−12 25.6	2 18 53.11	+ 5 39 28.1	9.082	0.683	5	17, 4	D.	" "
21	10 31 7	−0 59.45	− 3 31.3	2 14 24.59	+ 5 23 15.0	8.591	0.684	6	30, 6	D.	" "
1906											
Feb. 15	14 12 19	+1 30.97	− 0 16.0	8 9 32.08	+17 40 43.6	9.600	0.610	7	25, 5	Fn.	26-inch
17	8 53 46	−2 7.34	− 3 11.4	8 8 10.78	+17 48 15.4	9.245_n	0.516	8	25, 5	Fn.	" "
19	8 45 8	−2 5.42	− 1 1.7	8 6 43.89	+17 56 24.4	9.242_n	0.514	9	25, 5	Fn.	" "
19	9 5 25	−1 56.27	− 4 3.3	8 6 43.37	+17 56 28.3	9.128_n	0.506	10	25, 5	Fn.	" "
19	9 23 37	−0 7.53	+ 0 45.9	8 6 42.63	+17 56 32.1	8.987_n	0.500	11	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 19. m s	′	
1	14 44 54.65	+2.65	− 6 29 54.5	− 6.3	Wien-Ottakring, A. G. 5201	−1 46	+7.2	
2	14 35 52.34	+2.65	− 6 2 32.6	− 6.6	Straszburg, A. G. 5182	−1 46	+7.2	
3	14 39 16.69	+2.66	− 5 58 39.0	− 6.3	" " 5201	−1 46	+7.2	
						Veröff. 24.		
4	2 18 6.13	+3.67	+ 5 41 12.5	+12.9	Leipzig II, A. G. 888	−0 3	−0.4	Star has a faint companion n. fol.
5	2 21 12.61	+3.68	+ 5 51 41.0	+12.7	" " " 908	−0 3	−0.4	
6	2 15 20.37	+3.67	+ 5 26 33.6	+12.7	" " " 870	−0 3	−0.4	Moon very bright.
7	8 8 0.18	+0.93	+17 41 9.0	− 9.4	Berlin A, A. G. 3241	−0 27	+0.7	
8	8 10 17.19	+0.93	+17 51 36.2	− 9.4	" " " 3255	−0 27	+0.7	
9	8 8 48.40	+0.91	+17 57 35.5	− 9.4	" " " 3248	−0 26	+0.7	
10	8 8 38.72	+0.92	+18 0 40.9	− 9.3	" " " 3246	−0 26	+0.8	
11	8 6 49.25	+0.91	+17 55 55.6	− 9.4	" " " 3232	−0 26	+0.8	Star double; used n. pr. component.

(339) DOROTHEA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 20	11 49 39	+1 6.84	+2 19.5	4 12 1.49	+7 21 32.3	8.722_n	0.661	1	30, 6	D.	26-inch
22	13 2 18	+0 25.12	+3 46.2	4 10 19.81	+7 14 3.9	9.048	0.664	2	33, 7	D.	" "
25	11 21 25	+1 3.72	+0 25.0	4 7 53.59	+7 4 9.6	8.790_n	0.665	3	30, 6	D.	" "
25	11 40 42	+1 56.76	+1 52.6	4 7 52.97	+7 4 6.4	8.360_n	0.664	4	29, 6	D.	" "

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(339) DOROTHEA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 21. s	′	
1	4 10 50.41	+4.24	+7 19 9.0	+3.8	Leipzig II, A. G. 1568.....	+3	−0.4	
2	4 9 50.43	+4.26	+7 10 13.9	+3.8	" " " 1558.....	+4	−0.4	Haze.
3	4 6 45.58	+4.29	+7 3 40.6	+4.0	" " " 1539.....	+3	−0.4	
4	4 5 51.92	+4.29	+7 2 9.7	+4.1	" " " 1533.....	+3	−0.4	

(343) OSTARA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1899	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 31	10 2 2	−9 22.58	−12 51.1	20 46 15.49	−23 40 57.4	7.935_n	0.892	1	18, 10	See	26-inch
Sept. 1	11 0 11	−10 8.02	−13 51.1	20 45 30.05	−23 41 57.5	9.105	0.886	2	18, 5	See	" "
2	10 51 0	−10 49.38	−14 34.1	20 44 48.69	−23 42 40.5	9.070	0.887	3	6, 2	See	" "
1903											
Sept. 29	8 54 51	+0 55.71	+9 14.0	0 7 35.56	−3 27 26.2	9.474_n	0.764	4	28, 6	D.	26-inch
29	9 21 8	−2 27.34	+6 4.7	0 7 34.73	−3 27 30.2	9.408_n	0.766	5	29, 6	D.	" "
Oct. 12	10 47 48	+2 39.26	+3 59.0	23 56 25.28	−4 1 16.3	8.432	0.776	6	30, 6	D.	" "
13	13 28 55	+1 49.74	+2 21.6	23 55 35.76	−4 2 53.7	9.510	0.765	7	29, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 10. m s	′	
1	20 55 33.22	+4.85	−23 28 24.8	+18.5	Cordoba Gen. Cat. 28804.....	+0 21	+1.9	
2	20 55 33.22	+4.85	−23 28 24.8	+18.4	" " " 28804.....	+0 21	+1.9	
3	20 55 33.22	+4.85	−23 28 24.8	+18.4	" " " 28804.....	+0 21	+1.9	Clouded over.
						Veröff. 21.		
4	0 6 36.25	+3.60	−3 37 3.6	+23.4	Straszburg, A. G. 33.....	−2 8	−14.1	Star has a companion
5	0 9 58.47	+3.60	−3 33 58.1	+23.2	" " 44.....	−2 8	−14.1	n. pr.
6	23 53 42.43	+3.59	−4 5 38.7	+23.4	Newcomb's Fund. Cat. 1590.....	−2 6	−13.9	Seeing very fuzzy and
7	23 53 42.43	+3.59	−4 5 38.7	+23.4	" " " 1590.....	−2 6	−13.7	unst.

(344) DESIDERATA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 21	9 44 41	+2 49.86	+0 14.6	4 52 14.83	+32 38 1.9	9.595_n	0.319	1	25, 5	Fn.	26-inch
21	10 2 31	−2 36.47	+1 16.8	4 52 13.83	+32 38 5.9	9.560_n	0.275	2	25, 5	Fn.	" "
26	13 6 54	+1 4.56	+7 57.5	4 46 16.45	+32 52 4.8	9.002	9.983	3	25, 5	Fn.	" "

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(344) DESIDERATA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 28. s	′	
1	4 49 20.72	+4.25	+32 37 49.2	−1.9	Leiden, A. G. 1798	+11	+0.5	Seeing poor.
2	4 54 46.06	+4.24	+32 36 51.6	−2.5	" " 1828	+11	+0.6	Seeing poor.
3	4 45 7.54	+4.35	+32 44 8.5	−1.2	" " 1785	+11	+0.9	

(345) TERCIDINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 5	10 12 16	−1 38.95	−3 40.4	7 5 6.62	+ 5 44 57.2	9.347_n	0.687	1	30,6	Hd.	12-inch
13	11 41 1	+1 56.13	+2 0.2	6 56 47.17	+ 5 50 55.0	8.422	0.679	2	30,6	Hd.	" "
16	10 57 16	+0 37.41	−5 33.4	6 53 51.91	+ 5 56 27.2	8.504_n	0.678	3	24,8	Hd.	" "
19	9 33 6	−0 12.62	−3 54.8	6 51 6.48	+ 6 3 35.4	9.225_n	0.681	4	30,6	Hd.	" "
19	9 33 44	+0 55.44	+1 51.5	6 51 6.41	+ 6 3 34.8	9.222_n	0.681	5	29,6	Hd.	" "
1905											
May 21	11 5 25	+2 9.77	+2 12.5	16 27 35.02	−12 52 12.5	9.234_n	0.831	6	25,5	Hd.	26-inch
23	11 21 21	−2 17.90	−3 32.7	16 25 38.10	−12 39 19.9	9.083_n	0.834	7	25,5	Hd.	" "
27	10 14 48	+0 29.48	+8 28.9	16 21 45.83	−12 14 47.8	9.323_n	0.824	8	25,5	Hd.	" "
28	9 53 52	+3 30.21	+3 17.3	16 20 47.89	−12 8 52.3	9.379_n	0.820	9	20,4	Hd.	" "
28	10 23 39	−0 59.74	−5 20.8	16 20 46.54	−12 8 46.8	9.267_n	0.826	10	30,6	Hd.	" "

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		B. J. 1905. s	′ ″	
1	7 6 44.12	+1.45	+ 5 48 49.3	−11.7	Leipzig II, A. G. 3593	+1.55	−0 5.9	Seeing good.
2	6 54 49.52	+1.52	+ 5 49 7.4	−12.6	" " " 3416	+1.61	−0 6.4	Seeing good.
3	6 53 12.96	+1.54	+ 6 2 13.5	−12.9	" " " 3391	+1.66	−0 6.5	Seeing unst.
4	6 51 17.56	+1.54	+ 6 7 43.3	−13.1	" " " 3365	+1.66	−0 4.8	Seeing good.
5	6 50 9.43	+1.54	+ 6 1 56.4	−13.1	" " " 3343	+1.61	−0 5.5	Seeing good.
						B. J. 1907.		
6	16 25 23.09	+2.16	−12 54 27.6	+ 2.6	Camb., U. S., A. G. Zones	+1.33	+0 1.6	
7	16 27 53.82	+2.18	−12 35 49.9	+ 2.7	" " " "	+1.12	+0 0.7	Seeing very bad.
8	16 21 14.13	+2.22	−12 23 19.2	+ 2.5	" " " "	+1.09	+0 1.9	
9	16 17 15.46	+2.22	−12 12 11.9	+ 2.3	" " " "	+1.19	+0 3.0	
10	16 21 44.06	+2.22	−12 3 28.6	+ 2.6	" " " "	+1.11	+0 1.1	

(346) HERMENTARIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 11	13 9 44	+0 19.00	+8 6.7	22 40 29.42	−21 4 10.8	8.105_n	0.880	1	20,4	F.	12-inch

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(346) HERMENTARIA—Continued.

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						A. J. 381.		
	h m s	s	° ′ ″	″		s	′ ″	
1	22 40 6.25	+4.17	−21 12 39.0	+21.5	Algiers, A. G. Zones.....	+16.06	+1 11.2	

(347) PARIANA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 9	10 22 53	−1 35.36	+6 55.9	6 27 44.82	+28 37 45.8	9.051$_n$	0.209	1	25, 5	Fn.	26-inch
18	10 6 29	+1 48.76	−4 58.6	6 18 39.31	+29 23 11.1	8.696$_n$	0.159	2	25, 5	Fn.	" "
18	11 1 19	−2 38.68	−0 42.9	6 18 37.25	+29 23 23.0	8.880	0.165	3	25, 5	Fn.	" "
20	14 22 24	+1 29.30	−2 8.6	6 16 42.11	+29 32 46.7	9.663	0.499	4	23, 5	Fn.	" "
28	9 15 3	+0 30.20	−5 29.8	6 10 49.93	+30 2 25.1	8.777$_n$	0.130	5	20, 5	Fn.	" "
28	10 7 24	−0 4.86	+0 31.6	6 10 48.74	+30 2 32.5	8.784	0.130	6	8, 8	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Veröff. 28.		
	h m s	s	° ′ ″	″		s	′	
1	6 29 19.35	+0.83	+28 30 57.9	−8.0	Camb., Eng., A. G. 3341.....	−54	−0.2	
2	6 16 49.69	+0.86	+29 28 16.7	−7.0	" " " 3175.....	−52	−1.0	
3	6 21 15.07	+0.86	+29 24 13.0	−7.1	" " " 3231.....	−52	−1.0	
4	6 15 11.95	+0.86	+29 35 2.2	−6.9	" " " 3153.....	−52	−1.1	
5	6 10 18.91	+0.82	+30 8 1.0	−6.1	½ (Camb., Eng., A. G. 3078+ Leiden, A. G. 2534)	−52	−0.8	
6	6 10 52.77	+0.83	+30 2 7.0	−6.1	½ (Camb., Eng., A. G. 3089+ Leiden, A. G. 2541).	−52	−0.8	

(349) DEMBOWSKA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 20	9 59 36	+0 3.85	+4 50.8	10 54 19.10	+16 30 5.0	9.104$_n$	0.531	1	30, 6	Hd.	12-inch
20	10 17 46	−1 40.72	+1 24.4	10 54 18.53	+16 30 5.9	8.955$_n$	0.526	2	30, 6	Hd.	" "
27	10 19 12	−1 40.96	−1 2.7	10 49 20.30	+16 38 32.8	8.302$_n$	0.519	3	30, 6	Hd.	" "
27	10 39 43	+0 26.94	−5 15.0	10 49 19.62	+16 38 35.4	8.357	0.519	4	30, 6	Hd.	" "
28	10 52 28	+1 33.04	−1 12.5	10 48 40.41	+16 39 8.8	8.769	0.521	5	30, 6	Hd.	" "
28	11 14 42	+1 41.51	+3 4.8	10 48 39.82	+16 39 9.6	9.019	0.525	6	30, 6	Hd.	" "

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(349) DEMBOWSKA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	10 54 13.51	+1.74	+16 25 26.8	−12.6	Berlin A, A. G. 4322	....	.. ....	Seeing good.
2	10 55 57.51	+1.74	+16 28 54.1	−12.6	" " " 4331	....	.. ....	Seeing good.
3	10 50 59.55	+1.71	+16 39 47.8	−12.3	" " " 4301	....	.. ....	Seeing good.
4	10 48 50.97	+1.71	+16 44 2.7	−12.3	" " " 4293	....	.. ....	Seeing unsteady; woolly.
5	10 47 5.67	+1.70	+16 40 33.5	−12.2	" " " 4283	....	.. ....	
6	10 46 56.61	+1.70	+16 36 17.0	−12.2	" " " 4282	....	.. ....	

(350) ORNAMENTA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 30	11 40 4	−1 4.13	−9 0.0	4 56 43.74	+ 9 5 35.3	8.918_n	0.640	1	30, 6	D.	26-inch
Dec. 7	11 9 48	−0 9.23	−2 50.6	4 49 28.59	+ 9 56 59.3	8.869_n	0.628	2	10, 10	D.	" "
14	9 43 26	+3 10.04	−4 35.1	4 42 17.60	+10 53 20.1	9.244_n	0.623	3	38, 7	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 21. s	′	
1	4 57 43.47	+4.40	+ 9 14 36.9	−1.6	Leipzig II, A. G. 1949	−13	−1.5	
2	4 49 33.32	+4.50	+ 9 59 51.2	−1.3	" " " 1866	−12	−0.8	Est. mag. 11.5.
3	4 39 2.98	+4.58	+10 57 55.8	−0.6	Leipzig I, A. G. 1367	−10	−0.9	Sky very thick: obs'n barely possible.

(351) YRSA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 22	11 54 36	+1 27.98	− 6 58.4	0 28 13.29	−11 54 32.3	8.757_n	0.832	1	25, 5	Fn.	26-inch
22	12 27 44	−1 25.86	− 6 32.5	0 28 12.12	−11 54 40.9	8.020	0.832	2	23, 5	Fn.	" "
26	12 22 54	+0 33.07	−10 33.8	0 24 57.35	−12 17 43.5	8.595	0.834	3	25, 5	Fn.	" "
26	12 56 24	+1 42.10	− 7 4.8	0 24 56.18	−12 17 49.5	9.030	0.832	4	25, 5	Fn.	" "
1907											
Jan. 5	12 13 24	−2 17.95	− 3 26.5	8 7 19.66	+23 58 16.2	9.078_n	0.365	5	25, 5	Fn.	26-inch
10	12 34 37	+0 17.32	− 6 20.0	8 3 0.10	+24 36 59.1	8.342_n	0.332	6	15, 5	Fn.	" "
20	10 39 15	−1 26.17	− 2 6.8	7 53 41.88	+25 50 38.8	9.224_n	0.328	7	25, 5	Hd.	" "
20	10 56 18	−1 33.82	− 1 31.3	7 53 41.17	+25 50 43.8	9.118_n	0.314	8	25, 5	Hd.	" "

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(351) YRSA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 28. s	′	
1	0 26 42.50	+2.81	−11 47 52.3	+18.4	Camb. U. S., A. G. Zones.....	+3	−0.1	
2	0 29 35.18	+2.80	−11 48 26.7	+18.3	" " " "	+3	−0.1	
3	0 24 21.44	+2.84	−12 7 28.0	+18.3	" " " "	+3	−0.3	
4	0 23 11.24	+2.84	−12 11 3.0	+18.3	" " " "	+3	−0.3	
						Veröff. 31.		
5	8 9 37.23	+0.38	+24 1 49.1	− 6.4	Berlin B, A. G. 3306.....	+6	−0.1	
6	8 2 42.30	+0.48	+24 43 25.6	− 6.5	" " " 3273.....	+3	+0.2	
7	7 55 7.43	+0.62	+25 52 51.8	− 6.2	Camb. Eng., A. G. 4288.....	+5	+0.3	Seeing poor.
8	7 55 14.37	+0.62	+25 52 21.3	− 6.2	" " " 4289.....	+4	+0.3	Seeing poor.

(356) LIGURIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 12	13 55 53	+0 10.82	− 3 44.4	0 12 23.60	+1 47 10.9	9.138	0.724	1	15,5	Fn.	26-inch
12	14 5 44	−0 19.35	− 0 44.3	0 12 23.42	+1 47 9.5	9.193	0.724	2	25,5	Fn.	" "
12	14 21 11	−1 37.98	− 0 0.9	0 12 22.87	+1 47 8.5	9.266	0.724	3	25,5	Fn.	" "
25	11 42 12	−1 43.20	+ 6 17.4	0 0 19.60	+1 26 30.8	7.213_n	0.726	4	25,5	Fn.	" "
28	11 51 54	+1 26.61	−10 44.8	23 57 23.72	+1 20 56.7	8.673	0.727	5	25,5	Fn.	" "
28	12 13 0	+2 21.28	+ 0 8.7	23 57 22.76	+1 20 55.5	8.949	0.727	6	25,5	Fn.	" "
1907											
Mar. 15	10 37 18	+1 20.78	− 9 13.8	11 11 42.92	+6 54 56.7	9.104_n	0.669	7	24,5	R.	12-inch
22	10 31 59	+2 1.41	+ 6 7.6	11 5 26.74	+7 10 40.5	8.852_n	0.664	8	25,5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 28. s	′	
1	0 12 9.94	+2.84	+1 50 37.3	+18.0	Albany, A. G. 42.....	+11	+1.3	Bright moonlight.
2	0 12 39.93	+2.84	+1 47 35.8	+18.0	" " 44.....	+11	+1.3	Bright moonlight.
3	0 13 58.01	+2.84	+1 46 51.4	+18.0	" " 48.....	+11	+1.3	Bright moonlight.
4	0 1 59.86	+2.94	+1 19 54.3	+19.1	½ (Albany, A. G. 3+Nicolajew, A. G. 1).	+11	+1.4	
5	23 55 54.16	+2.95	+1 31 22.2	+19.3	½ (Albany, A. G. 8226+Nicolajew, A. G. 5935).	+10	+1.2	
6	23 54 58.54	+2.94	+1 20 27.5	+19.3	½ (Albany, A. G. 8221+Nicolajew, A. G. 5928).	+10	+1.3	
						Veröff. 31.		
7	11 10 21.20	+0.94	+7 4 17.3	− 6.8	Leipzig II, A. G. 5741.....	+11	−1.6	Seeing good; est. mag. 10.5.
8	11 3 24.40	+0.93	+7 4 39.8	− 6.9	" " " 5697.....	+11	−1.3	Seeing fair; ast. quite faint because of Moon.

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(359) GEORGIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 19	13 57 32	−1 24.35	−5 54.1	9 10 30.56	+23 56 47.9	9.517	0.466	1	25, 5	Fn.	26-inch
23	13 0 19	+0 36.59	+1 35.4	9 7 3.74	+24 2 23.8	9.418	0.422	2	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 29. m s	′	
1	9 11 53.90	+1.01	+24 2 50.8	−8.8	Berlin B, A. G. 3710	−1 29	+6.4	Star double; used s. pr. component.
2	9 6 26.14	+1.01	+24 0 56.8	−8.4	" " " 3678	−1 30	+6.2	

(362) HAVNIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 14	11 40 12	−0 36.26	− 1 43.8	0 51 42.18	− 0 12 18.7	9.284_n	0.742	1	30, 6	D.	26-inch
15	11 2 16	−1 22.11	− 4 10.2	0 50 56.34	− 0 14 45.0	9.399_n	0.743	2	30, 6	D.	" "
20	11 43 25	+0 57.40	+ 8 2.3	0 46 43.16	− 0 27 55.0	9.124_n	0.744	3	30, 6	D.	" "
21	12 5 53	+0 3.39	+ 5 17.8	0 45 49.16	− 0 30 39.4	8.904_n	0.745	4	10, 10	D.	" "
22	13 44 2	−0 9.02	+11 15.8	0 44 51.44	− 0 33 31.1	9.094	0.745	5	10, 10	D.	" "
1905											
Jan. 28	11 56 2	−0 9.14	+ 8 21.6	9 22 27.86	+28 44 16.1	9.096_n	0.210	6	29, 6	Hd.	12-inch
30	11 23 9	+4 16.08	− 1 39.9	9 20 23.63	+28 52 19.4	9.243_n	0.230	7	22, 5	Hd.	" "
Feb. 4	10 42 8	−1 9.08	− 7 46.4	9 15 4.80	+29 10 9.3	9.321_n	0.240	8	30, 6	Hd.	" "
10	11 58 42	+3 43.77	− 1 23.0	9 8 37.35	+29 25 53.1	8.455	0.154	9	23, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. s	′	
1	0 52 14.97	+3.47	− 0 10 55.7	+20.8	Nicolajew, A. G. 177	− 4	−0.6	
2	0 52 14.97	+3.48	− 0 10 55.7	+20.9	" " 177	− 4	−0.5	Illumination of wires variable.
3	0 45 42.21	+3.55	− 0 36 18.6	+21.3	" " 151	− 3	−0.3	Seeing fine.
4	0 45 42.21	+3.56	− 0 36 18.6	+21.4	" " 151	− 3	−0.2	
5	0 44 56.89	+3.57	− 0 45 8.5	+21.6	" " 148	− 3	−0.2	
						Veröff. 26.		
6	9 22 35.83	+1.17	+28 36 6.8	−12.3	Camb., Eng., A. G. 4964	−16	+1.0	Seeing poor.
7	9 16 6.34	+1.21	+28 54 11.5	−12.2	" " " 4924	−15	+1.1	Seeing fair.
8	9 16 12.61	+1.27	+29 18 7.6	−11.9	" " " 4927	−15	+1.4	Seeing fair.
9	9 4 52.25	+1.33	+29 27 27.3	−11.2	" " " 4849	−15	+1.3	Seeing good.

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(364) ISARA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 13	12 25 29	−1 14.40	−2 58.2	9 32 8.06	+21 31 28.8	8.756	0.418	1	20, 4	Fn.	26-inch
17	10 44 28	+3 3.52	−0 27.4	9 28 5.53	+21 59 2.6	9.067_n	0.416	2	25, 5	Fn.	" "
19	10 43 46	+1 1.51	−1 27.6	9 26 6.34	+22 11 54.5	8.990_n	0.407	3	25, 5	Fn.	" "
19	11 0 55	−0 48.80	−4 8.2	9 26 5.55	+22 11 59.6	8.786_n	0.402	4	24, 5	Fn.	" "
28	12 53 20	−2 12.72	−2 54.6	9 18 4.33	+22 59 11.9	9.420	0.446	5	25, 5	Fn.	" "
28	13 12 42	−2 1.22	−0 47.5	9 18 3.69	+22 59 15.7	9.473	0.465	6	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 29. s	′	
1	9 33 21.47	+0.99	+21 34 36.2	−9.2	Berlin B, A. G. 3808	−8	+0.2	Seeing bad; thick clouds.
2	9 25 1.00	+1.01	+21 59 39.1	−9.1	" " " 3771	−9	+0.2	
3	9 25 3.81	+1.02	+22 13 31.2	−9.1	" " " 3772	−9	+0.2	
4	9 26 53.33	+1.02	+22 16 16.9	−9.1	" " " 3787	−9	+0.2	
5	9 20 16.04	+1.01	+23 2 14.8	−8.3	" " " 3752	−8	+0.2	
6	9 20 3.90	+1.01	+23 0 11.5	−8.3	" " " 3751	−7	+0.2	

(371) BOHEMIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 22	10 46 55	−2 3.01	−1 6.2	2 40 58.56	+26 11 54.3	9.351_n	0.355	1	30, 6	Fk.	26-inch
26	9 24 10	+0 34.46	−9 15.6	2 37 27.93	+25 56 18.7	9.548_n	0.446	2	8, 8	Fk.	" "
28	9 1 10	+2 36.57	−1 50.6	2 35 38.93	+25 47 34.4	9.572_n	0.467	3	30, 6	Fk.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. m s	′	
1	2 42 57.08	+4.49	+26 12 49.0	+11.5	Camb., Eng., A. G. 1458	−1 2	−5.1	Seeing bad.
2	2 36 48.94	+4.53	+26 5 21.7	+12.6	" " " 1418	−1 2	−5.1	
3	2 32 57.82	+4.54	+25 49 11.7	+13.3	" " " 1393	−1 2	−5.2	

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(374) BURGUNDIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 27	9 37 28	−0 17.67	+5 49.7	4 24 23.44	+15 31 27.0	9.444_n	0.581	1	10, 10	D.	26-inch
27	10 1 8	−0 48.49	+2 26.9	4 24 22.83	+15 31 21.8	9.375_n	0.569	2	30, 6	D.	" "
Dec. 6	10 36 55	+1 6.34	+0 39.2	4 16 16.91	+14 52 29.3	8.919_n	0.554	3	30, 6	D.	" "
6	10 59 43	−1 2.40	+2 40.7	4 16 16.00	+14 52 26.0	8.558_n	0.551	4	34, 6	D.	" "
1905											
Feb 24	13 0 29	+1 49.09	−1 7.2	10 8 2.22	− 1 58 9.2	9.140	0.757	5	30, 6	D.	26-inch
1906											
June 29	12 4 57	−0 28.75	−3 30.2	17 57 5.97	−11 41 59.3	8.879	0.830	6	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21.		
1	4 24 36.55	+4.56	+15 25 35.3	+ 2.0	Berlin A, A. G. 1199.....	s − 2	′ 0	
2	4 25 6.76	+4.56	+15 28 53.0	+ 1.9	" " " 1202.....	− 2	0	
3	4 15 5.95	+4.62	+14 51 47.4	+ 2.7	Leipzig I, A. G. 1266.....	− 1	0	
4	4 17 13.78	+4.62	+14 49 42.9	+ 2.4	" " " 1278.....	− 1	0	
						Veröff. 26.		
5	10 6 11.69	+1.44	− 1 56 49.7	−12.3	Nicolajew, A. G. 3011.....	+ 1	−0.2	Seeing poor.
						Veröff. 29.		
6	17 57 32.52	+2.20	−11 38 36.3	+ 7.2	Camb., U. S., A. G. Zones.....	+10	−0.7	

(375) URSULA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 14	10 57 0	+1 28.94	−4 39.8	10 21 31.21	+13 7 20.3	9.330_n	0.599	1	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	10 20 1.51	+0.76	+13 12 6.8	−6.7	Leipzig I, A. G. 4013.....	....	.. ....	

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(379) HUENNA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 30	12 53 52	+0 3.11	− 5 48.5	0 28 33.22	+2 21 10.9	9.077	0.718	1	10, 10	D.	26-inch
30	13 27 2	−1 29.97	− 5 6.3	0 28 32.43	+2 21 3.7	9.260	0.719	2	30, 6	D.	" "
Oct. 13	14 12 4	−1 0.93	−11 8.2	0 19 28.52	+1 13 23.4	9.543	0.733	3	27, 6	D.	" "
14	13 56 32	−0 31.23	+ 7 5.5	0 18 51.01	+1 8 44.0	9.525	0.733	4	24.6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	0 28 26.43	+3.68	+2 26 36.8	+22.6	Albany, A. G. 105.....	....	.. ....	Seeing steady; fine.
2	0 29 58.72	+3.68	+2 25 47.5	+22.5	" " 116.....	....	.. ....	Seeing getting unst., but
3	0 20 25.76	+3.69	+1 24 8.6	+23.0	" " 75.....	....	.. ....	good.
4	0 19 18.56	+3.68	+1 1 15.4	+23.1	Nicolajew, A. G. 57.....	....	.. ....	

(381) MYRRHA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 20	11 6 55	−0 29.45	+2 48.5	2 51 35.49	−1 54 47.1	9.328_n	0.756	1	8, 8	Fk.	26-inch
21	11 43 14	+2 9.34	+2 39.4	2 50 52.84	−1 59 22.5	9.138_n	0.758	2	29, 6	Fk.	" "
27	10 17 37	+1 12.74	−2 32.6	2 46 36.80	−2 24 4.2	9.384_n	0.759	3	30, 6	Fk.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Veröff. 21.		
	h m s	s	° ′ ″	″		s	′	
1	2 52 1.25	+3.69	−1 57 48.9	+13.3	Nicolajew, A. G. 619.....	−13	−1.9	
2	2 48 39.79	+3.71	−2 2 15.3	+13.4	Straszburg, A. G. 692.....	−12	−1.9	
3	2 45 20.29	+3.77	−2 21 45.0	+13.4	" " 682.....	−13	−1.6	Seeing very unst.

(382) DODONA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 25	15 25 5	−1 23.16	−5 10.9	3 56 11.67	+30 21 38.7	9.644	0.450	1	30, 6	D.	26-inch
Dec. 7	8 12 58	+1 59.01	−6 12.2	3 46 0.37	+29 42 35.3	9.507_n	0.319	2	30, 6	D.	" "
13	10 2 40	+0 43.63	−2 54.1	3 41 15.87	+29 19 25.2	8.443_n	0.159	3	29, 6	D.	" "

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(382) DODONA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 21. s	′	
1	3 57 29.71	+5.12	+30 26 44.4	+5.2	Leiden, A. G. 1524	−23	−1.1	
2	3 43 56.20	+5.16	+29 48 39.8	+7.7	Camb., Eng., A. G. 1862	−24	−1.2	Est. mag. 13.5.
3	3 40 27.10	+5.14	+29 22 10.8	+8.5	" " " 1840	−21	−1.2	Seeing very unst.

(386) SIEGENA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
July 25	12 53 49	+0 15.96	−2 47.8	20 54 56.89	+2 24 30.1	8.520	0.717	1	20, 4	F.	12-inch
31	12 14 8	+3 38.98	−5 19.6	20 50 34.93	+1 36 39.8	7.983	0.725	2	15, 3	F.	" "
Aug. 3	13 19 43	+1 57.95	+3 37.2	20 48 17.52	+1 11 32.7	9.218	0.730	3	17, 4	F.	" "
19	10 18 14	+3 53.10	−7 12.1	20 36 55.02	−1 35 7.7	8.657_n	0.755	4	20, 4	F.	" "
1904											
Feb. 24	14 26 4	+1 11.38	+0 30.3	12 1 29.08	+2 43 27.9	8.896	0.714	5	30, 6	D.	26-inch
Mar. 8	13 16 3	−0 18.53	−8 1.1	11 53 18.48	+4 44 22.2	8.760	0.692	6	10, 10	D.	" "
8	13 39 28	+0 8.32	−8 33.9	11 53 17.80	+4 44 31.1	9.016	0.693	7	10, 10	D.	" "
13	13 22 24	+0 32.10	−0 44.9	11 49 48.51	+5 32 17.8	9.063	0.684	8	29, 6	D.	" "
13	13 35 41	+0 37.17	+7 50.0	11 49 48.10	+5 32 23.4	9.150	0.685	9	30, 6	D.	" "
1905											
May 27	11 40 5	+2 12.20	+5 32.0	15 59 46.24	+7 34 58.3	7.045	0.658	10	25, 5	Hd.	26-inch
27	11 52 39	+0 4.96	−3 13.2	15 59 45.75	+7 34 59.9	8.423	0.658	11	30, 6	Hd.	" "
June 8	9 37 27	−0 0.66	+4 9.9	15 50 56.69	+7 51 27.8	9.119_n	0.658	12	10, 10	Hd.	" "
14	9 35 30	+2 6.54	+1 52.3	15 46 59.99	+7 48 29.8	8.910_n	0.656	13	25, 5	Hd.	" "
18	10 48 46	+2 22.47	−0 39.9	15 44 36.17	+7 42 30.5	9.008	0.658	14	25, 5	Hd.	" "
18	11 8 42	+2 43.91	+3 19.7	15 44 36.13	+7 42 27.9	9.148	0.660	15	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 3361, 3365. s	′	
1	20 54 37.26	+3.67	+2 27 8.0	+9.9	Albany, A. G. 7359	+30	−2.2	
2	20 46 52.23	+3.72	+1 41 49.2	+10.1	" " 7308	+30	−3.0	
3	20 46 15.80	+3.77	+1 7 44.9	+10.6	" " 7302	+30	−1.1	
4	20 32 58.03	+3.89	−1 28 7.0	+11.4	Nicolajew, A. G. 5227	+30	−1.0	
						Veröff. 22.		
5	12 0 16.09	+1.61	+2 43 8.6	−11.0	Albany, A. G. 4419	−1	−1.3	
6	11 53 35.25	+1.76	+4 52 35.6	−12.3	½(Albany, A. G. 4387+Leipzig II, A. G. 5977).	−1	−1.3	Seeing very poor; thick.
7	11 53 7.72	+1.76	+4 53 17.3	−12.3	½(Albany, A. G. 4384+Leipzig II, A. G. 5975).	−1	−1.3	Seeing fair, but thick.
8	11 49 14.61	+1.80	+5 31 45.5	−12.6	Leipzig II, A. G. 5952	−1	−1.4	
9	11 49 9.13	+1.80	+5 24 46.0	−12.6	" " " 5950	−1	−1.4	

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(386) SIEGENA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 26. s	′	
10	15 57 32.05	+1.99	+7 29 24.1	+2.2	Leipzig II, A. G. 7165.....	−2	+0.1	
11	15 59 38.79	+2.00	+7 38 10.9	+2.2	" " " 7179.....	−2	+0.1	
12	15 50 55.31	+2.04	+7 47 14.2	+3.7	" " " 7128.....	−2	+0.3	Seeing poor.
13	15 44 51.42	+2.03	+7 46 33.0	+4.5	" " " 7093.....	−2	+0.2	
14	15 42 11.68	+2.02	+7 43 5.5	+4.9	" " " 7085.....	−2	+0.3	
15	15 41 50.20	+2.02	+7 39 3.3	+4.9	" " " 7083.....	−2	+0.3	Star shows indication of proper motion.

(387) AQUITANIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 31	12 12 30	−4 54.02	−9 10.3	3 37 54.72	− 7 29 36.1	8.918_n	0.801	1	20, 4	F.	12-inch
Nov. 6	11 25 42	−0 47.21	−6 44.2	3 32 41.67	− 7 50 10.3	9.073_n	0.803	2	19, 4	F.	" "
1903											
Feb. 4	10 16 33	−1 21.06	−1 37.9	9 35 39.88	+19 11 3.6	9.451_n	0.527	3	15, 4	Hd.	12-inch
4	10 29 35	−1 11.42	−6 56.7	9 35 39.60	+19 11 8.9	9.414_n	0.517	4	20, 5	Hd.	" "
5	11 48 22	−1 27.76	−2 54.9	9 34 45.83	+19 20 17.3	8.982_n	0.472	5	19, 4	Hd.	" "
1904											
June 3	11 12 33	−4 0.51	−3 43.4	16 56 30.30	+ 5 17 12.0	9.040_n	0.687	6	25, 5	Hd.	12-inch
8	11 37 36	+4 30.23	−5 16.3	16 52 9.83	+ 4 53 6.4	8.084_n	0.690	7	25, 5	Hd.	" "
11	11 22 38	+3 33.10	−2 33.8	16 49 35.55	+ 4 34 29.6	8.125_n	0.693	8	25, 5	Hd.	" "
12	10 30 3	+0 59.60	−0 15.6	16 48 46.45	+ 4 27 48.9	9.034_n	0.696	9	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. J. 385. s	′ ″	
1	3 42 44.43	+4.31	− 7 20 50.2	+24.4	Wien-Ottakring, A. G. 913.....	+0.27	+0 2.9	
2	3 33 24.49	+4.39	− 7 43 50.1	+24.0	" " " 865.....	+0.58	−0 3.7	
3	9 36 58.95	+1.99	+19 12 57.2	−15.7	Berlin A, A. G. 3903.....	....	.. ....	Ast. very faint.
4	9 36 49.03	+1.99	+19 18 21.3	−15.7	" " " 3900.....	....	.. ....	Ast. very faint.
5	9 36 11.59	+2.00	+19 23 27.9	−15.7	" " " 3895.....	....	.. ....	Ast. very faint.
6	17 0 28.37	+2.44	+ 5 20 50.4	+ 5.0	Leipzig II, A. G. 7617.....	....	.. ....	Seeing good; est. mag 9.2.
7	16 47 37.12	+2.48	+ 4 58 17.4	+ 5.3	½(Leipzig II, A. G. 7531+Albany, A. G. 5577).	....	.. ....	Seeing good.
8	16 45 59.94	+2.51	+ 4 36 57.6	+ 5.8	Albany, A. G. 5570.....	....	.. ....	Seeing good; clouded up.
9	16 47 44.33	+2.52	+ 4 27 58.5	+ 6.0	" " 5578.....	....	.. ....	Seeing good.

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(388) CHARYBDIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 11	9 53 35	+1 49.61	−4 2.3	8 40 36.59	+25 5 2.5	9.257$_n$	0.355	1	28, 6	D.	26-inch
11	10 11 5	+0 29.77	−2 30.6	8 40 35.77	+25 5 3.9	9.159$_n$	0.341	2	29, 6	D.	" "
11	10 32 44	+2 27.64	−3 23.4	8 40 34.74	+25 5 5.9	8.991$_n$	0.328	3	30, 6	D.	" "
15	10 40 40	+3 46.37	−4 33.3	8 37 14.13	+25 9 8.6	8.589$_n$	0.316	4	30, 6	D.	" "
17	12 19 21	+2 4.53	−7 12.5	8 35 35.42	+25 10 34.3	9.290	0.359	5	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 22. s	′	
1	8 38 45.27	+1.71	+25 9 18.1	−13.3	Camb., Eng., A. G. 4674.....	+8	−0.7	Seeing fuzzy and hazy.
2	8 40 4.28	+1.72	+25 7 47.8	−13.3	" " " 4680.....	+8	−0.7	Seeing fuzzy and hazy; star has n. fol. companion 30″, of 11.5 mag.
3	8 38 5.38	+1.72	+25 8 42.6	−13.3	" " " 4669.....	+8	−0.7	Seeing fuzzy and hazy.
4	8 33 26.04	+1.72	+25 13 54.8	−12.9	" " " 4628.....	+7	−0.7	Seeing very poor.
5	8 33 29.17	+1.72	+25 17 59.5	−12.7	" " " 4629.....	+7	−0.7	

(393) LAMPETIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 20	10 44 50	−0 51.79	−0 51.5	0 51 35.98	+18 4 59.9	9.416$_n$	0.536	1	30, 6	D.	26-inch
21	9 43 26	+2 29.38	+1 47.1	0 50 56.64	+17 54 8.8	9.546$_n$	0.579	2	30, 6	D.	" "
22	10 12 8	+0 5.80	−1 4.4	0 50 14.05	+17 42 20.8	9.477$_n$	0.558	3	10, 10	D.	" "
23	10 8 44	+1 37.45	−4 35.0	0 49 31.70	+17 30 36.0	9.474$_n$	0.560	4	30, 6	D.	" "
25	10 42 48	+0 39.92	−2 36.1	0 48 4.28	+17 5 58.4	9.344$_n$	0.540	5	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. m s	′	
1	0 52 23.90	+3.87	+18 5 32.3	+19.1	Berlin A, A. G. 266.....	+1 57	+2.5	Seeing fine.
2	0 48 23.39	+3.87	+17 52 2.2	+19.5	" " " 238.....	+1 57	+2.6	
3	0 50 4.37	+3.88	+17 43 5.7	+19.5	" " " 248.....	+1 57	+2.8	
4	0 47 50.36	+3.89	+17 34 51.2	+19.8	" " " 233.....	+1 57	+2.9	
5	0 47 20.46	+3.90	+17 8 14.3	+20.2	" " " 230.....	+1 57	+3.1	Seeing fine.

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(402) CHLOE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 21	9 26 9	+0 32.00	− 0 15.0	9 45 9.89	+20 2 56.0	9.434$_n$	0.507	1	28, 6	Fk.	26-inch
21	10 0 22	+0 30.81	+ 0 0.3	9 45 8.71	+20 3 11.3	9.319$_n$	0.483	2	29, 6	Hd.	12-inch
22	9 14 48	−0 11.02	− 1 2.8	9 44 21.11	+20 12 52.7	9.452$_n$	0.510	3	30, 10	Hd.	" "
22	9 48 40	−0 12.22	− 0 48.0	9 44 19.91	+20 13 7.5	9.346$_n$	0.484	4	10, 10	D.	26-inch
23	9 57 46	−2 56.36	−13 55.4	9 43 31.23	+20 23 1.0	9.291$_n$	0.472	5	19, 4	Hd.	12-inch
25	10 8 19	+1 6.16	−13 39.6	9 41 56.05	+20 42 15.1	9.193$_n$	0.454	6	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 19.		
						m s	′	
1	9 44 35.80	+2.09	+20 3 26.7	−15.7	Berlin B, A. G. 3854	−16 12	+37.4	
2	9 44 35.80	+2.10	+20 3 26.7	−15.7	" " " 3854	−16 12	+37.4	
3	9 44 30.02	+2.11	+20 14 11.1	−15.6	" " " 3853	−16 12	+37.0	Good obs'n.
4	9 44 30.02	+2.11	+20 14 11.1	−15.6	" " " 3853	−16 11	+37.0	
5	9 46 25.48	+2.11	+20 37 12.0	−15.6	" " " 3860	−16 10	+36.5	
6	9 40 47.77	+2.12	+20 56 10.1	−15.4	" " " 3840	−16 7	+35.6	

(403) CYANE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 16	11 29 49	+1 50.86	+6 24.1	12 54 25.21	−16 46 15.0	8.492	0.860	1	30, 6	D.	26-inch
16	11 44 51	+0 59.06	+2 50.8	12 54 24.51	−16 46 10.7	8.795	0.859	2	25, 5	D.	" "
19	11 36 51	+1 9.21	+0 19.3	12 52 14.85	−16 22 11.1	8.872	0.856	3	34, 7	D.	" "
21	11 15 53	−0 44.19	+6 25.4	12 50 52.77	−16 6 8.7	8.700	0.856	4	30, 6	D.	" "
21	11 35 57	−2 16.39	+9 17.0	12 50 52.23	−16 6 3.0	8.961	0.854	5	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 22.		
						s	′	
1	12 52 32.09	+2.26	−16 52 27.9	−11.2	Washington, A. G. 4943	−60	+5.2	Seeing good.
2	12 53 23.20	+2.25	−16 48 50.3	−11.2	" " 4948	−59	+5.2	Seeing good.
3	12 51 3.40	+2.24	−16 22 18.9	−11.5	" " 4932	−60	+5.3	Seeing steady, but fuzzy and thick.
4	12 51 34.72	+2.24	−16 12 22.4	−11.7	" " 4938	−60	+5.3	Seeing unst.
5	12 53 6.38	+2.24	−16 15 8.4	−11.6	" " 4947	−60	+5.3	Seeing unst.

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(405) THIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 21	12 2 14	+3 55.37	+3 22.3	17 23 44.24	−19 35 42.0	8.872	0.872	1	30, 6	Hd.	12-inch
30	11 31 43	+0 11.12	+2 13.8	17 16 10.20	−18 31 19.9	8.999	0.866	2	40, 8	Hd.	" "
30	11 39 1	−0 34.61	+1 29.6	17 16 9.94	−18 31 17.9	9.060	0.865	3	29, 6	Hd.	" "
July 1	10 8 24	−3 30.72	−3 55.1	17 15 28.75	−18 25 9.7	8.814_n	0.867	4	25, 5	Hd.	" "
1905											
Nov. 25	10 16 36	−3 23.91	+4 23.4	4 39 46.40	+24 21 13.5	9.417_n	0.414	5	25, 5	Fn.	26-inch
26	9 18 39	−0 48.95	+2 13.6	4 38 47.34	+24 16 18.5	9.547_n	0.478	6	25, 5	Fn.	" "
Dec. 4	11 35 45	−4 49.09	−5 9.8	4 30 19.38	+23 32 24.2	7.454_n	0.362	7	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 19. m s	′	
1	17 19 45.48	+3.39	−19 39 10.7	+6.4	Cincinnati 1885, 2842.....	+0 27	+2.1	
2	17 15 55.67	+3.41	−18 33 39.9	+6.2	U. S. Naval Obs. trans. cir. position.	+0 25	+0.4	
3	17 16 41.13	+3.42	−18 32 53.8	+6.3	" " " " " "	+0 25	+0.4	
4	17 18 56.05	+3.42	−18 21 21.1	+6.5	Radcliffe 1890, 4530.....	+0 25	0.0	
						Veröff. 28.		
5	4 43 6.30	+4.01	+24 16 50.6	−0.5	Berlin B, A. G. 1530.....	−1 4	−4.8	
6	4 39 32.26	+4.03	+24 14 5.0	−0.1	" " " 1512.....	−1 4	−4.8	
7	4 35 4.35	+4.12	+23 37 33.3	+0.7	" " " 1488.....	−1 2	−4.9	

(406) ERNA=[1905 QU].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 21	8 45 22	−1 58.03	−7 2.4	22 33 24.99	−5 21 9.8	9.315_n	0.781	1	25, 5	Hd.	26-inch
22	8 53 48	+3 45.98	−1 27.7	22 32 46.74	−5 23 38.8	9.262_n	0.783	2	20, 4	Hd.	" "
24	10 28 39	+1 31.05	+3 17.8	22 31 31.84	−5 28 30.9	8.314	0.787	3	25, 5	Hd.	" "
27	10 34 50	+2 10.44	+4 21.1	22 29 53.18	−5 35 1.7	8.777	0.788	4	25, 5	Hd.	" "
27	10 49 52	−1 31.51	+3 21.4	22 29 52.87	−5 35 3.2	8.953	0.787	5	25, 5	Hd.	" "
Oct. 3	9 23 53	+3 17.16	−7 23.2	22 27 15.48	−5 45 22.7	8.475_n	0.789	6	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Unpub. eph. by Hd. from elements in A. N. Nr. 4050. s	′ ″	
1	22 35 20.20	+2.82	−5 14 27.7	+20.3	Warsaw 5708.....	−20.07	+0 4.0	Seeing fair.
2	22 28 57.95	+2.81	−5 22 31.4	+20.3	" 5687.....	−21.17	+0 3.2	Seeing poor; ast. faint.
3	22 29 57.99	+2.80	−5 32 9.0	+20.3	" 5692.....	−23.36	+0 1.4	Star double; used s. fol. component; good obs'n.

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(406) ERNA=[1905 QU]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Unpub. eph. by Hd. from elements in A. N. Nr. 4050.		
	h m s	s	° ′ ″	″		s	′ ″	
4	22 27 39.96	+2.78	−5 39 43.0	+20.2	Wien-Ottakring, A. G. 8043.....	−26.27	−0 4.8	Seeing poor; ast. faint.
5	22 31 21.59	+2.79	−5 38 44.8	+20.2	" " " 8062.....	−26.25	−0 5.1	Seeing poor; ast. faint.
6	22 23 55.59	+2.73	−5 38 19.6	+20.1	" " " 8029.....	−32.37	−0 18.5	Seeing poor.

(407) ARACHNE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 13	10 51 25	−2 19.82	+3 28.1	12 15 44.94	−14 5 9.0	7.441	0.845	1	25,5	Hd.	26-inch
15	10 18 48	+0 27.31	−0 24.8	12 14 13.35	−13 53 40.6	8.653$_n$	0.844	2	25,5	Hd.	" "
15	10 34 42	+2 25.58	+4 7.3	12 14 13.00	−13 53 38.0	8.090$_n$	0.844	3	25,5	Hd.	" "
18	11 43 27	+1 17.24	−2 38.7	12 11 58.45	−13 35 46.1	9.190	0.837	4	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Veröff. 29.		
	h m s	s	° ′ ″	″		s	′	
1	12 18 3.33	+1.43	−14 8 28.1	−9.0	Washington, A. G. 4761.....	+8	−1.1	Seeing bad; thick.
2	12 13 44.62	+1.42	−13 53 6.4	−9.4	Radcliffe 1890, 3194.....	+8	−1.1	Seeing fair.
3	12 11 46.01	+1.41	−13 57 35.8	−9.5	Camb., U. S., A. G. Zones.....	+8	−1.1	Seeing fair.
4	12 10 39.82	+1.39	−13 32 57.7	−9.7	Radcliffe 1890, 3177.....	+8	−0.9	Seeing good.

(409) ASPASIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 29	9 23 54	+3 52.05	− 8 14.0	2 45 38.34	+22 25 13.9	9.530$_n$	0.502	1	29,6	Fk.	26-inch
Nov. 2	9 7 18	−0 47.95	+ 6 26.0	2 41 59.58	+21 55 38.8	9.522$_n$	0.507	2	29,6	Fk.	" "
3	8 28 48	−1 41.73	− 1 2.4	2 41 5.80	+21 48 10.4	9.582$_n$	0.544	3	30,6	Fk.	" "
6	9 12 50	−1 55.51	+ 6 41.2	2 38 18.57	+21 24 25.5	9.463$_n$	0.493	4	30,6	Fk.	" "
6	9 51 59	−1 4.45	+11 44.3	2 38 17.00	+21 24 12.7	9.340$_n$	0.459	5	30,6	Fk.	" "

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(409) ASPASIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	2 41 41.85	+4.44	+22 33 15.3	+12.6	Berlin B, A. G. 830	....	.. ....	Seeing unst.
2	2 42 43.07	+4.46	+21 49 0.0	+12.8	" " " 835	....	.. ....	Moonlight.
3	2 42 43.07	+4.46	+21 49 0.0	+12.8	" " " 835	....	.. ....	Seeing poor; unst.; moonlight.
4	2 40 9.61	+4.47	+21 17 31.1	+13.2	" " " 826	....	.. ....	Seeing poor; unst.; moonlight.
5	2 39 16.98	+4.47	+21 12 15.0	+13.4	" " " 820	....	.. ....	Seeing poor; unst.; moonlight.

(414) LIRIOPE = [1907 BE].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 13	10 41 0	+0 51.26	+7 51.4	2 39 2.78	+1 59 54.8	8.771_n	0.721	1	25, 5	Hd.	26-inch
13	10 41 0	−2 30.61	+1 6.1	2 39 2.74	+1 59 55.3	8.771_n	0.721	2	25, 5	Hd.	" "
14	10 54 1	+0 46.73	−8 24.1	2 38 19.69	+1 58 23.2	8.377_n	0.721	3	18, 5	Fn.	" "
25	9 46 16	−1 57.47	+2 49.9	2 31 8.90	+1 50 49.6	8.766_n	0.722	4	25, 5	Hd.	" "
29	9 7 53	−0 1.28	+1 1.7	2 28 54.44	+1 52 11.7	8.994_n	0.722	5	30, 5	Hd.	" "
Dec. 2	9 44 24	+0 37.28	+3 11.2	2 27 21.53	+1 54 40.2	6.563	0.722	6	30, 6	Hd.	" "
8	9 27 50	+2 27.53	−0 46.6	2 24 46.12	+2 3 26.9	8.293	0.720	7	25, 5	Hd.	" "
11	9 35 49	+1 24.52	+5 29.1	2 23 43.09	+2 9 42.4	8.786	0.719	8	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	2 38 8.65	+2.87	+1 51 51.8	+11.6	Albany, A. G. 753	....	.. ....	
2	2 41 30.47	+2.88	+1 58 37.8	+11.4	" " 776	....	.. ....	
3	2 37 30.08	+2.88	+2 6 35.8	+11.5	" " 752	....	.. ....	
4	2 33 3.47	+2.90	+1 47 48.8	+10.9	" " 732	....	.. ....	Seeing fair; est. mag. 13.0.
5	2 28 52.83	+2.89	+1 50 59.2	+10.8	" " 715	....	.. ....	Est. mag. 13.0.
6	2 26 41.37	+2.88	+1 51 18.4	+10.6	" " 705	....	.. ....	Seeing poor.
7	2 22 15.73	+2.86	+2 4 3.0	+10.5	" " 677	....	.. ....	
8	2 22 15.73	+2.84	+2 4 3.0	+10.3	" " 677	....	.. ....	Seeing poor: ast. too ft. to observe well.

(415) PALATIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1905	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 2	12 54 35	+1 8.82	−3 46.4	6 5 39.63	+15 16 52.3	9.292	0.563	1	29, 6	Hd.	12-inch
4	11 8 32	+2 52.13	−3 10.9	6 4 7.25	+15 29 53.7	7.214	0.540	2	25, 5	Hd.	" "

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(415) PALATIA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 8	10 42 23	−3 38.32	+1 59.4	6 1 10.12	+15 57 18.6	8.144_n	0.532	3	30, 6	Hd.	12-inch
14	10 13 43	+0 51.35	−1 26.3	5 57 28.92	+16 39 18.0	8.228_n	0.519	4	30, 6	Hd.	" "
14	10 53 21	+1 44.34	−0 43.0	5 57 27.93	+16 39 28.0	8.817	0.521	5	14, 3	Hd.	" "
15	9 25 19	+1 41.50	−2 48.2	5 56 59.03	+16 46 7.3	9.033_n	0.524	6	30, 6	Hd.	" "
15	9 48 17	−1 21.79	+2 20.3	5 56 58.69	+16 46 15.8	8.783_n	0.519	7	25, 5	Hd.	" "
16	10 5 23	+0 18.77	−2 21.5	5 56 29.10	+16 53 22.7	8.199_n	0.514	8	20, 10	Hd.	" "
20	10 13 10	−1 27.11	−3 42.0	5 54 51.62	+17 21 36.0	8.566	0.506	9	30, 6	Hd.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	6 4 29.73	+1.08	+15 20 48.8	−10.1	Berlin A, A. G. 1948.....	....	.. ....	Seeing good.
2	6 1 14.03	+1.09	+15 33 14.7	−10.1	" " " 1906.....	....	.. ....	Seeing good.
3	6 4 47.33	+1.11	+15 55 29.4	−10.2	" " " 1954.....	....	.. ....	Seeing good.
4	5 56 36.46	+1.11	+16 40 54.4	−10.1	" " " 1856.....	....	.. ....	Seeing poor.
5	5 55 42.48	+1.11	+16 40 21.1	−10.1	" " " 1846.....	....	.. ....	Seeing poor; clouds interfere.
6	5 55 16.42	+1.11	+16 49 5.6	−10.1	" " " 1838.....	....	.. ....	Seeing unst.
7	5 58 19.37	+1.11	+16 44 5.7	−10.2	" " " 1876.....	....	.. ....	Seeing unst.
8	5 56 9.22	+1.11	+16 55 54.4	−10.2	" " " 1850.....	....	.. ....	Seeing good.
9	5 56 17.62	+1.11	+17 25 28.1	−10.1	" " " 1853.....	....	.. ....	Seeing excellent.

(417) SUEVIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 19	10 12 59	+1 8.67	+0 56.1	3 56 3.03	+14 2 54.7	9.342_n	0.587	1	29, 6	D.	26-inch
20	12 42 53	+2 12.58	+3 29.2	3 55 4.26	+13 58 3.4	8.954	0.570	2	30, 6	D.	" "
22	11 7 1	−0 37.91	+7 34.1	3 53 20.88	+13 49 40.3	8.938_n	0.572	3	28, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. m s	′	
1	3 54 49.94	+4.42	+14 1 53.2	+5.4	Leipzig I, A. G. 1168.....	−1 27	−6.1	
2	3 52 47.25	+4.43	+13 54 28.6	+5.6	" " " 1152.....	−1 27	−6.0	
3	3 53 54.35	+4.44	+13 42 0.8	+5.4	" " " 1159.....	−1 27	−6.0	Seeing very unst.

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(419) AURELIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO COMP	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 14	10 51 23	+0 37.67	−1 21.2	3 25 3.14	+18 23 30.8	9.091$_n$	0.495	1	25, 5	Hd.	26-inch
14	11 5 22	−0 30.72	−5 13.3	3 25 2.25	+18 23 29.9	8.976$_n$	0.491	2	25, 5	Hd.	" "
29	12 28 35	−0 39.76	+2 15.7	3 11 14.55	+17 15 50.3	9.348	0.538	3	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Veröff. 28.		
	h m s	s	° ′ ″	″		s	′	
1	3 24 21.76	+3.71	+18 24 44.9	+7.1	Berlin A, A. G. 932.....	+6	−0.4	Seeing good.
2	3 25 29.25	+3.72	+18 28 36.2	+7.0	" " " 935.....	+6	−0.4	Seeing good.
3	3 11 50.54	+3.77	+17 13 26.1	+8.5	" " " 877.....	+2	−0.1	

(420) BERTHOLDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 21	9 54 47	−1 32.38	+1 14.6	1 48 1.33	+17 6 4.2	9.364$_n$	0.543	1	35, 7	Fk.	26-inch
22	9 33 30	−1 4.88	+2 47.9	1 47 18.96	+17 0 57.4	9.417$_n$	0.554	2	30, 6	Fk.	" "
25	9 24 7	−1 16.94	−5 36.2	1 45 11.06	+16 45 6.9	9.403$_n$	0.555	3	30, 6	Fk.	" "
26	8 41 46	+1 20.10	+7 18.6	1 44 29.64	+16 39 55.5	9.499$_n$	0.579	4	30, 6	Fk.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Veröff. 21.		
	h m s	s	° ′ ″	″		s	′	
1	1 49 29.56	+4.15	+17 4 32.1	+17.5	Berlin A, A. G. 546.....	−55	−3.5	
2	1 48 19.68	+4.16	+16 57 51.9	+17.6	" " " 541.....	−55	−3.5	
3	1 46 23.83	+4.17	+16 50 25.1	+18.0	" " " 532.....	−56	−3.6	
4	1 43 5.38	+4.16	+16 32 18.5	+18.4	" " " 513.....	−56	−3.6	Seeing bad.

(423) DIOTIMA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 15	12 20 31	−1 12.45	+0 31.0	12 20 28.00	+15 6 33.1	8.736$_n$	0.548	1	30, 6	D.	26-inch
15	12 36 10	+0 50.32	+4 41.7	12 20 27.62	+15 6 39.1	8.346$_n$	0.547	2	28, 6	D.	" "

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(423) DIOTIMA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 22. s	′	
1	12 21 38.73	+1.72	+15 6 14.0	−11.9	Berlin A, A. G. 4674.....	+7	−0.6	Seeing very thick; very unst. at times.
2	12 19 35.58	+1.72	+15 2 9.3	−11.9	" " " 4666.....	+7	−0.6	Seeing very thick; very unst. at times.

(426) HIPPO.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 30	13 17 58	+1 31.04	+4 4.8	4 3 14.33	+47 31 23.7	9.497	9.885_n	1	40, 8	D.	26-inch
Dec. 3	12 18 33	+4 15.41	+1 10.9	3 59 42.28	+47 15 19.7	9.283	0.039_n	2	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 1 37.01	+6.28	+47 27 13.8	+5.1	Newcomb's Fund. Cat. 260.....	....	.. ....	
2	3 55 20.59	+6.28	+47 14 2.3	+6.5	Bonn, A. G. 3322.....	....	.. ....	

(431) NEPHELE=[1906 UH].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 28	10 32 27	+0 41.97	−6 46.0	14 40 14.94	−12 52 57.0	9.309_n	0.828	1	25, 5	Fn.	26-inch
May 3	12 59 13	−2 32.43	+3 51.6	14 36 13.99	−12 34 14.8	9.136	0.832	2	25, 5	Fn.	" "
4	11 31 28	+2 25.87	−0 35.7	14 35 29.73	−12 30 46.5	8.499_n	0.836	3	25, 5	Hd.	" "
10	9 47 10	−0 42.06	−4 28.2	14 30 51.14	−12 9 33.9	9.261_n	0.826	4	25, 5	Fn.	" "
20	9 54 8	−2 44.80	−9 47.7	14 23 31.29	−11 37 2.1	8.887_n	0.829	5	25, 5	Hd.	" "
29	11 26 8	−0 28.97	+3 31.2	14 17 54.59	−11 13 40.3	9.275	0.820	6	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	14 39 31.36	+1.61	−12 46 8.0	−3.0	Camb., U. S., A. G. Zones.....	....	.. ....	

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(431) NEPHELE=[1906 UH]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
2	14 38 44.77	+1.65	−12 38 3.2	−3.2	Camb, U. S., A. G. Zones.....	....	.. ....	
3	14 33 2.21	+1.65	−12 30 7.3	−3.5	" " " "	....	.. ....	Seeing fair.
4	14 31 31.52	+1.68	−12 5 2.3	−3.4	" " " "	....	.. ....	
5	14 26 14.39	+1.70	−11 27 10.8	−3.6	" " " "	....	.. ....	Seeing poor.
6	14 18 21.88	+1.68	−11 17 7.7	−3.8	Radcliffe 1890, 3725.....	....	.. ....	

(432) PYTHIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 18	11 32 39	−1 52.50	+4 25.8	16 55 48.22	−19 16 40.1	8.662	0.872	1	27,5	Hd.	12-inch
21	10 9 49	+0 38.51	−1 38.3	16 52 52.88	−19 39 56.8	8.991_n	0.871	2	24,8	Hd.	" "
1904											
Nov. 16	12 3 28	+1 50.40	+2 48.3	3 15 13.49	+ 5 38 33.9	8.800	0.682	3	29,6	D.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″				
1	16 57 37.37	+3.35	−19 21 10.3	+4.4	Cincinnati 1885, 2797.....	Veröff. 19, m s −1 13	+4.9	
2	16 52 11.00	+3.37	−19 38 22.5	+4.0	" " 2789.....	−1 11	+5.1	
3	3 13 19.32	+3.77	+ 5 35 37.3	+8.3	Leipzig II, A. G. 1226.....	Veröff. 24. −0 27	+2.4	

(433) EROS.

NOTE.—Observations of Eros made during the opposition of 1900 are published in the Publications of the U. S. Nav. Obs., Second Series, Vol. III, Part I.

DATE.	WASHINGTON MEAN TIME.	PLANET STAR. $\Delta\alpha$	PLANET STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
[illegible]	[illegible]	[illegible]	2 10.6	20 43 37.87	−6 20 38.5	8.335	0.794	1	8,5	Br.	26-inch
			2 45.7	20 42 45.47	−6 20 49.0	8.853_n	0.794	2	8,5	Br.	" "
			0 28.9	20 41 53.13	−6 21 0.6	8.088	0.794	3	8,5	Br.	" "
			11 0.1	21 12 44.59	−4 4 35.2	9.535	0.764	4	20,4	F.	12-inch
			4 31.3	21 27 7.42	−3 7 17.5	9.061	0.767	5	8,5	Br.	26-inch
			1 50.4	21 46 59.55	−1 41 24.5	9.085	0.755	6	8,5	Br.	" "
			0 34.7	21 54 46.21	−1 5 58.8	9.243	0.749	7	8,3	Br.	" "
			2 48.76	22 2 48.76	−0 28 19.4	9.361	0.744	8	12,4	Br.	" "
			2 52.03	22 2 52.03	−0 28 7.4	9.474	0.743	9	5,1	F.	12-inch
			0 40.53	22 0 40.53	+1 59 7.9	9.328	0.723	10	15,4	Br.	26-inch

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(433) EROS—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 1	6 11 44	−0 53.41	−2 57.5	22 53 18.12	+ 3 46 17.5	9.373	0.709	11	14, 5	Br.	26-inch
2	6 30 12	−0 18.28	+4 15.7	22 55 41.63	+ 3 58 54.3	9.430	0.708	12	8, 5	Br.	" "
1907											
Sept. 25	10 58 8	+0 56.31	+6 17.0	0 57 25.19	+35 36 8.9	9.392_n	9.947	13	30, 6	Fn.	26-inch
25	11 20 39	+0 53.34	−6 49.4	0 57 23.89	+35 36 23.0	9.291_n	9.862	14	25, 5	Fn.	" "
30	9 4 39	+1 6.50	−8 4.1	0 49 30.36	+36 33 33.0	9.623_n	0.220	15	20, 4	Fn.	" "
Oct. 3	8 36 57	+1 26.68	−6 40.5	0 44 6.50	+37 0 58.9	9.643_n	0.242	16	25, 5	Hd.	" "
12	7 52 52	+1 6.21	−4 41.0	0 26 3.99	+37 44 22.4	9.632_n	0.185	17	25, 5	Fn.	" "
12	8 9 50	−1 15.04	−1 39.7	0 26 2.39	+37 44 20.6	9.600_n	0.117	18	30, 6	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		A. N. 3517, 3521. s	′	
1	20 43 18.59	+4.32	− 6 18 46.0	+18.1	Wien-Ottakring, A. G. 7450	+ 3	−0.1	Est. mag. about 12.
2	20 42 45.77	+4.31	− 6 23 52.8	+18.1	" " " 7447	+ 3	−0.1	
3	20 41 36.20	+4.29	− 6 20 49.6	+17.9	Microm. comp. with Wien-Ottak., A. G. 7434 {+0m 20s.62 / +0′ 20″.7}	+ 4	−0.1	
4	21 15 11.84	+3.59	− 3 53 46.4	+20.3	U. S. Naval Obs. trans. circle position.	+ 62	+1.2	
5	21 26 57.31	+3.55	− 3 12 9.9	+21.1	U. S. Naval Obs. trans. circle position.	+ 75	+1.9	
6	21 46 49.09	+3.50	− 1 45 46.2	+22.3	Nicolajew, A. G. 5523	+ 90	+2.9	
7	21 52 27.13	+3.47	− 1 6 45.0	+22.5	" " 5537	+ 97	+3.3	
8	22 3 26.59	+3.46	− 0 26 16.0	+23.1	" " 5580	+104	+3.6	
9	22 3 26.59	+3.46	− 0 26 16.0	+23.1	" " 5580	+104	+3.6	$\Delta\delta$ of record changed by interchanging thds. 5 and 4.
10	22 33 45.88	+4.50	+ 1 59 32.7	+24.5	1/5 (Bonn VI, A. G. + Mün. I, A. G. + 3 Mün. II, A. G).	+126	+5.0	A proper motion of s.0321 in R. A. has been applied to star.
						A. N. 3532.		
11	22 54 11.07	+0.46	+ 3 49 8.9	+ 6.1	Albany, A. G. 7933	− 9	−0.7	
12	22 55 59.45	+0.46	+ 3 54 32.6	+ 6.0	" " 7943	− 9	−0.7	
						B. J. 1909. s	′ ″	
13	0 56 25.93	+2.95	+35 29 40.4	+11.5	Lund, A. G. 419	−1.24	−0 8.0	
14	0 56 27.60	+2.95	+35 43 0.9	+11.5	" " 420	−1.07	−0 6.3	
15	0 48 20.83	+3.03	+36 41 23.9	+13.2	" " 349	−1.04	−0 5.4	
16	0 42 36.77	+3.05	+37 7 25.2	+14.2	" " 307	−1.07	−0 7.8	
17	0 24 54.72	+3.06	+37 48 46.2	+17.2	" " 176	−1.13	−0 7.2	
18	0 27 14.36	+3.07	+37 45 43.2	+17.1	" " 192	−1.20	−0 10.2	

(443) PHOTOGRAPHICA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
May 21	9 37 17	+1 10.76	−3 18.3	14 31 12.12	−8 27 40.1	9.068_n	0.807	1	25, 5	Hd.	26-inch
21	9 49 19	+0 50.39	+2 24.7	14 31 11.78	−8 27 39.2	8.970_n	0.808	2	25, 5	Hd.	" "

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(443) PHOTOGRAPHICA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
May 25	11 8 17	−2 31.77	−3 18.7	14 25 17.86	−8 13 8.2	9.011	0.806	3	25, 5	Fn.	26-inch
25	11 28 43	+2 19.96	+0 18.6	14 25 18.31	−8 13 3.7	9.153	0.804	4	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE	δ	RED. TO APP. PLACE	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 29. s	′	
1	14 [illegible]	[illegible]	8 24 18.8	3.0	Wien-Ottakring, A.G. 5126.....	+39	−1.9	Seeing fair.
2	14 [illegible]	[illegible]	8 [illegible]	3.0	" " " 5130.....	+39	−1.9	Seeing fair.
3	14 [illegible]	[illegible]	8 9 51.8	2.7	" " " 5134.....	+36	−1.7	Seeing poor.
4	14 [illegible]	[illegible]	8 13 10.3	3.0	" " " 5114.....	+37	−1.7	Seeing poor; star has a s. fol. companion, 9.5 mag., proper motion of about 0".1 in R. A.

(444) CYPTIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
[illegible]	h m s	m s	′ ″	h m s	° ′ ″						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	+3 33 56.7	8.964	0.705	1	29, 6	R.	12-inch
	[illegible]	[illegible]	[illegible]	[illegible]	+3 33 50.5	9.110	0.706	2	25, 5	R.	" "
	[illegible]	[illegible]	[illegible]	[illegible]	+3 13 55.6	9.449	0.715	3	25, 5	R.	" "
	[illegible]	[illegible]	[illegible]	[illegible]	+3 13 41.1	9.521	0.718	4	30, 6	R.	" "
	[illegible]	[illegible]	[illegible]	[illegible]	+2 24 56.8	6.397n	0.716	5	25, 5	R.	" "
	[illegible]	[illegible]	[illegible]	[illegible]	+2 24 47.5	8.621	0.716	6	25, 5	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

[illegible]	[illegible]	[illegible]	[illegible]	AUTHORITY.	O–C α	O–C δ	REMARKS.
					Bull. Astron. 22. m s	′	
[illegible]	[illegible]	[illegible]	[illegible]	Albany, A.G. 7963.....	−2 9	−9.2	Seeing good.
[illegible]	[illegible]	[illegible]	[illegible]	" 7960.....	−2 9	−9.2	Seeing good.
[illegible]	[illegible]	[illegible]	[illegible]	" 7955.....	−2 10	−9.2	Seeing good; fine obs'n.
[illegible]	[illegible]	[illegible]	[illegible]	" 7979.....	−2 10	−9.2	Seeing fine.
[illegible]	[illegible]	[illegible]	[illegible]	" 7959.....	−2 9	−9.2	Seeing fair; full Moon.
[illegible]	[illegible]	[illegible]	[illegible]	" 7949.....	−2 9	−9.2	Seeing fair; bright Moon; good obs'n.

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(449) HAMBURGA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 29	13 11 47	+0 46.36	+6 9.1	1 12 6.75	+2 36 49.9	8.790	0.714	1	30, 6	D.	26-inch
Oct. 2	14 15 15	−0 18.67	+1 45.9	1 9 31.32	+2 20 35.6	9.321	0.720	2	10, 10	D.	" "
2	14 47 24	−2 9.01	+6 44.7	1 9 30.27	+2 20 29.6	9.422	0.721	3	30, 6	D.	" "
13	15 4 18	−3 24.60	−7 16.5	0 59 38.71	+1 22 13.4	9.562	0.732	4	28, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21.		
1	1 11 16.73	+3.66	+2 30 20.7	+20.1	Albany, A. G. 344.....	s −32	′ −1.9	
2	1 9 46.31	+3.68	+2 18 29.4	+20.3	" " 339.....	−34	−1.9	
3	1 11 35.60	+3.68	+2 13 24.7	+20.2	" " 346.....	−34	−1.9	
4	1 2 59.57	+3.74	+1 29 9.1	+20.8	" " 303.....	−33	−1.9	

(451) PATIENTIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 6	11 41 57	−0 21.99	−3 57.1	2 32 3.71	−4 23 14.6	8.439	0.779	1	37, 8	D.	26-inch
11	11 22 10	−0 41.48	−3 54.8	2 27 50.44	−4 19 30.6	8.552	0.778	2	30, 6	D.	" "
11	11 36 20	+0 59.38	+4 35.7	2 27 50.03	−4 19 29.8	7.609	0.778	3	30, 6	D.	" "
14	10 31 59	+3 47.73	−3 22.2	2 25 25.85	−4 21 45.1	8.562_n	0.778	4	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	2 32 22.23	+3.47	−4 19 29.1	+11.6	Straszburg, A. G. 636.....	....	.. ....	
2	2 28 28.43	+3.49	−4 15 47.2	+11.4	" " 616.....	....	.. ....	Seeing very unst.
3	2 26 47.17	+3.48	−4 24 17.0	+11.5	" " 610.....	....	.. ....	Seeing very unst.
4	2 21 34.63	+3.49	−4 18 34.5	+11.6	" " 591.....	....	.. ....	

(454) MATHESIS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 17	9 54 25	+2 45.11	−9 22.9	10 40 52.33	+18 17 14.8	9.532_n	0.568	1	28, 6	D.	26-inch

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(470) KILIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 4024. s	′	
3	16 56 32.07	+2.38	−9 37 56.4	+5.7	Wien-Ottakring, A. G. 5832	−39	+0.8	Ast. faint; sky thick; bright Moon.
4	16 53 20.51	+2.40	−9 34 49.5	+5.9	" " " 5821	−37	+0.8	Seeing poor.

(471) PAPAGENA.

WASHINGTON MEAN TIME	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
h m s	m s	′ ″	h m s	° ′ ″						
2[illegible] 19	+0 29.99	−3 58.1	1 42 27.73	−14 1 44.9	9.055	0.842	1	25, 5	Fn.	12-inch
[illegible] 28	−0 53.57	+6 57.1	1 30 58.08	−13 5 15.5	9.348	0.828	2	30, 6	Fn.	" "
[illegible] 47	−1 51.73	+7 22.4	1 30 57.61	−13 5 10.8	9.407	0.823	3	30, 6	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	° ′ ″	″		A. N. 4200. m s	′	
[illegible]	−13 58 0.2	+13.4	Washington, A. G. 439.....	−5 7	−42.5	Seeing fair.
[illegible]	−13 12 24.4	+11.8	Camb., U. S., A. G. Zones.....	−4 52	−38.4	Seeing poor.
[illegible]	−13 12 45.0	+11.8	" " " "	−4 51	−38.4	Seeing poor.

(478) TERGESTE.

PLANET–STAR. α	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
	″	h m s	° ′ ″						
[illegible]	[illegible] 9.6	13 8 9.64	−18 17 8.4	9.071	0.864	1	10, 10	D.	26-inch
[illegible]	[illegible] 42.5	13 4 45.47	−17 36 11.9	9.220_n	0.856	2	30, 6	D.	" "
[illegible]	[illegible] 22.2	13 4 44.59	−17 36 0.8	9.045_n	0.861	3	30, 6	D.	" "
[illegible]	[illegible] 42.4	12 57 5.38	−15 45 42.2	9.231	0.847	4	30, 6	D.	" "
[illegible]	[illegible]	22 46 56.74	+ 9 38 8.6	9.005_n	0.634	5	25, 5	Hd.	26-inch
[illegible]	[illegible]	22 46 30.12	+ 9 30 33.1	9.141_n	0.638	6	25, 5	Hd.	" "

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(478) TERGESTE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 22. s	′	
1	13 8 18.93	+2.30	−18 18 58.8	−10.2	Washington, A. G. {5018 / 5019}	−30	+2.3	Seeing unst.; star is double; mean of two components used.
2	13 0 39.60	+2.29	−17 44 43.2	−11.2	" " 4985	−30	+2.5	
3	13 2 43.10	+2.29	−17 29 28.6	−11.0	" " 4994	−30	+2.5	
4	12 58 35.00	+2.24	−15 49 11.8	−11.8	" " 4972	−30	+2.5	Seeing thick.
						A. N. 4118.		
5	22 47 52.56	+2.56	+ 9 43 25.6	+20.2	Leipzig II, A. G. 11435	− 1	−1.0	Seeing good.
6	22 47 37.51	+2.55	+ 9 20 6.0	+20.3	" " " 11430	− 2	−1.1	

(483) SEPPINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 21	10 13 50	+2 1.44	+7 40.3	1 38 53.09	−3 18 29.1	9.222_n	0.768	1	25, 5	Hd.	26-inch
22	10 41 58	+2 59.83	−0 38.7	1 38 13.88	−3 25 50.0	9.018_n	0.770	2	25, 5	Hd.	" "
29	9 39 38	−4 5.98	−2 32.4	1 33 52.35	−4 12 24.3	9.212_n	0.775	3	20, 4	Hd.	" "
Nov. 4	10 16 12	−1 35.88	+0 10.5	1 30 22.07	−4 46 47.5	8.589_n	0.782	4	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 28. s	′	
1	1 36 48.61	+3.04	−3 26 24.2	+14.8	Straszburg, A. G. 391	−6	+1.7	
2	1 35 11.00	+3.05	−3 25 26.2	+14.9	" " 383	−6	+1.7	
3	1 37 55.27	+3.06	−4 10 6.0	+14.1	" " 397	−5	+1.6	Seeing good.
4	1 31 54.89	+3.06	−4 47 12.0	+14.0	" " 370	−5	+1.5	Seeing fair; ast. very faint; haze and Moon.

(484) PITTSBURGHIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 2	10 43 45	+0 38.56	−4 21.1	12 16 34.59	+15 35 31.4	9.016_n	0.544	1	25, 5	Hd.	26-inch
2	11 5 42	+3 27.59	+3 14.2	12 16 33.97	+15 35 37.4	8.770_n	0.540	2	25, 5	Hd.	" "

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(484) PITTSBURGHIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 29. m s	′	
1	12 15 54.83	+1.20	+15 39 59.1	−6.6	Berlin A, A. G. 4648.....	+3 11	−12.0	Seeing good.
2	12 13 5.18	+1.20	+15 32 29.8	−6.6	" " " 4635.....	+3 11	−12.0	Seeing good.

(487) VENETIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 28	11 21 29	+1 30.22	+0 55.2	11 53 45.46	+15 43 32.5	8.253$_n$	0.536	1	25, 5	Hd.	26-inch
28	11 33 23	−0 19.38	−3 57.6	11 53 44.98	+15 43 35.3	7.835	0.536	2	18, 6	Hd.	" "
31	10 6 20	+3 33.62	−0 22.4	11 51 27.55	+15 57 28.5	9.154$_n$	0.543	3	25, 5	Hd.	" "
Apr. 7	11 14 9	−1 15.57	+0 56.8	11 46 22.35	+16 23 28.2	8.805	0.526	4	25, 5	Hd.	" "
1907											
Oct. 3	11 54 6	−0 15.02	−1 43.2	1 45 9.31	− 7 12 14.7	9.104$_n$	0.798	5	25, 5	Fn.	26-inch
3	12 2 48	−0 28.46	−2 31.3	1 45 8.84	− 7 12 17.8	9.042$_n$	0.799	6	30, 6	Fn.	" "
13	10 22 50	−0 58.87	+6 3.8	1 37 16.56	− 8 13 35.9	9.323$_n$	0.800	7	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 26. s	′	
1	11 52 13.80	+1.44	+15 42 46.5	− 9.2	Berlin A, A. G. 4568.....	+31	−2.1	
2	11 54 2.91	+1.45	+15 47 42.1	− 9.2	" " " 4575.....	+31	−2.1	
3	11 47 52.49	+1.44	+15 57 59.9	− 9.0	" " " 4546.....	+31	−2.1	
4	11 47 36.49	+1.43	+16 22 39.6	− 8.2	" " " 4544.....	+30	−2.0	
						A. N. 4199. s	′ ″	
5	1 45 21.88	+2.45	− 7 10 46.6	+15.1	Wien-Ottakring, A. G. 379.....	+0.98	+0 7.2	
6	1 45 34.85	+2.45	− 7 10 1.6	+15.1	" " " 380.....	+0.80	+0 6.6	
7	1 38 12.87	+2.56	− 8 19 54.4	+14.7	" " " 354.....	+0.97	+0 8.8	

(490) VERITAS.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 17	11 21 27	−0 21.73	+2 2.9	5 52 27.70	+9 57 50.1	8.989$_n$	0.629	1	38, 8	D.	26-inch
18	14 53 3	−1 19.19	+1 40.0	5 51 30.25	+9 57 27.1	9.493	0.657	2	30, 6	D.	" "

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(490) VERITAS—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. m s	′	
1	5 52 44.83	+4.60	+9 55 56.0	−8.8	Leipzig II, A. G. 2526.....	+9 31	+8.2	Seeing unst.
2	5 52 44.83	+4.61	+9 55 56.0	−8.9	" " " 2526.....	+9 30	+8.3	

(492) GISMONDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 18	9 18 4	+0 53.88	+0 9.4	6 22 1.17	+25 0 16.9	9.584_n	0.491	1	30, 6	D.	26-inch
18	9 35 13	+1 1.44	−1 5.0	6 22 0.37	+25 0 20.4	9.554_n	0.468	2	30, 6	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 21. s	′	
1	6 21 2.23	+5.06	+25 0 20.0	−12.5	½ (Camb., Eng., A. G. 3232+Ber. B, A. G. 2385).	+44	−1.7	
2	6 20 53.87	+5.06	+25 1 37.9	−12.5	½ (Camb., Eng., A. G. 3229+Ber. B, A. G. 2383).	+44	−1.6	

(503) EVELYN.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 13	13 22 13	−2 2.00	+ 0 7.1	3 11 14.02	+14 50 54.0	9.304	0.571	1	25, 5	Fn.	26-inch
22	14 7 39	+0 23.27	−12 21.5	3 2 30.21	+14 38 16.7	9.543	0.618	2	12, 5	Fn.	" "
24	11 47 32	−0 44.51	+11 18.4	3 0 45.49	+14 36 7.6	9.085	0.562	3	25, 5	Fn.	" "
Dec. 4	11 14 24	+2 2.43	+ 9 52.1	2 52 35.05	+14 29 36.8	9.176	0.568	4	25, 5	Fn.	" "
4	11 37 40	+2 47.05	− 1 5.7	2 52 34.28	+14 29 35.7	9.289	0.575	5	25, 5	Fn.	" "

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(503) EVELYN—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 30. m s	′	
1	3 13 12.72	+3.30	+14 50 38.1	+ 8.8	Leipzig I, A. G. 983	+3 7	+16.7	
2	3 2 3.59	+3.35	+14 50 28.5	+ 9.7	" " " 929	+3 3	+16.6	
3	3 1 26.65	+3.35	+14 24 39.5	+ 9.7	" " " 927	+3 2	+16.7	
4	2 50 29.28	+3.34	+14 19 34.4	+10.3	" " " 870	+2 54	+16.8	
5	2 49 43.89	+3.34	+14 30 31.0	+10.4	" " " 865	+2 54	+16.8	

(504) CORA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 4	11 7 58	−0 15.42	−2 15.1	2 1 19.01	−10 41 27.2	6.872_n	0.824	1	25,5	Hd.	26-inch
4	11 15 46	−0 20.49	+1 33.4	2 1 18.50	−10 41 24.8	8.180	0.824	2	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 32. s	′	
1	2 1 31.74	+2.69	−10 39 24.3	+12.2	Camb., U. S., A. G. Zones	+14	+1.0	
2	2 1 36.30	+2.69	−10 43 10.3	+12.1	Radcliffe 1890, 476	+14	+1.0	

(505) CAVA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 5	10 22 41	−1 1.06	−3 23.0	0 7 29.57	−17 44 14.4	9.018_n	0.862	1	25,5	Hd.	26-inch
5	10 34 35	−1 3.05	−2 22.0	0 7 29.06	−17 44 16.1	8.902_n	0.863	2	25,5	Hd.	" "
5	10 50 38	−2 34.25	−4 16.7	0 7 28.51	−17 44 17.9	8.666_n	0.864	3	25,5	Hd.	" "
6	11 32 53	+1 47.20	+1 10.7	0 6 36.42	−17 47 21.1	8.718	0.864	4	25,5	Hd.	" "
6	11 49 1	+1 19.85	−1 40.5	0 6 35.77	−17 47 20.8	8.934	0.863	5	25,5	Hd.	" "

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(505) CAVA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 32. s	″	
1	0 8 28.10	+2.53	−17 41 6.3	+14.9	Washington, A. G. 43	−3.5	−15	Seeing poor.
2	0 8 29.58	+2.53	−17 42 9.0	+14.9	" " 44	−3.6	−15	Seeing poor.
3	0 10 0.23	+2.53	−17 40 16.1	+14.9	" " 53	−3.5	−15	Seeing poor.
4	0 4 46.69	+2.53	−17 48 46.5	+14.7	" " 18	−3.6	−15	Seeing fair.
5	0 5 13.39	+2.53	−17 45 55.0	+14.7	" " 24	−3.7	−12	Seeing fair.

(509) JOLANDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 10	9 44 29	+2 2.99	−3 36.2	8 10 25.26	−2 14 55.4	9.113_n	0.760	1	25,5	Fn.	26-inch
10	10 5 34	+2 17.98	+6 34.8	8 10 24.68	−2 14 52.5	8.948_n	0.760	2	25,5	Fn.	" "
13	9 54 4	+0 20.81	+0 15.0	8 8 24.90	−1 59 45.0	8.925_n	0.758	3	25,5	Hd.	" "
13	10 11 7	+1 58.17	+1 10.5	8 8 24.47	−1 59 40.8	8.702_n	0.758	4	25,5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 31. s	′	
1	8 8 21.50	+0.77	−2 11 10.3	−8.9	Straszburg, A. G. 3104	+53	−1.5	
2	8 8 5.93	+0.77	−2 21 18.3	−9.0	" " 3103	+53	−1.4	
3	8 8 3.33	+0.76	−1 59 50.9	−9.1	" " 3102	+53	−1.6	
4	8 6 25.54	+0.76	−2 0 42.1	−9.2	" " 3089	+52	−1.6	

(511) DAVIDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1905	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 10	10 19 29	+2 17.22	+ 0 43.0	1 42 32.69	−14 17 42.1	7.978_n	0.846	1	25,5	Fn.	26-inch
10	10 41 24	−2 57.59	− 7 18.0	1 42 32.02	−14 17 39.4	8.553	0.846	2	25,5	Fn.	" "
10	12 1 48	+0 6.62	+ 4 5.1	1 42 29.75	−14 17 33.2	9.292	0.837	3	8,8	Fn.	" "
14	12 32 55	+1 11.40	+ 3 24.8	1 39 59.78	−14 7 2.9	9.452	0.824	4	25,5	Fn.	12-inch
14	12 58 22	−1 53.23	− 8 37.7	1 39 59.00	−14 7 3.3	9.509	0.816	5	25,5	Fn.	" "
1907 Feb. 25	12 57 27	+2 3.36	+11 45.0	9 46 7.37	+28 42 35.6	9.305	0.252	6	20,5	R.	12-inch

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(511) DAVIDA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 28. m s	′	
1	1 40 12.50	+2.97	−14 18 36.5	+11.4	Washington, A. G. 433.....	−1 14	−8.4	Seeing fair. The Wash. M. T. may be 1 min. greater.
2	1 45 26.63	+2.98	−14 10 32.7	+11.3	" " 458.....	−1 15	−8.4	Seeing fair. The Wash. M. T. may be 1 min. greater.
3	1 42 20.16	+2.97	−14 21 49.6	+11.3	" " 441.....	−1 14	−8.4	Seeing fair.
4	1 38 45.42	+2.96	−14 10 38.6	+10.9	" " 427.....	−1 14	−8.1	Seeing excellent.
5	1 41 49.26	+2.97	−13 58 36.4	+10.8	" " 439.....	−1 14	−8.1	Seeing excellent.
						A. N. 4151.		
6	9 44 3.14	+0.87	+28 30 56.2	−5.6	Camb., Eng., A. G. 5099.....	+0 59	−0.6	Seeing good.

(514) ARMIDA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 4	11 49 2	−0 16.93	+ 3 23.2	10 22 12.01	+4 34 39.2	8.476	0.693	1	25, 5	Fn.	26-inch
4	12 0 36	+0 54.02	+10 12.4	10 22 11.67	+4 34 40.9	8.725	0.693	2	5, 1	Fn.	" "
5	11 40 40	−1 16.92	− 8 25.0	10 21 26.74	+4 38 56.5	8.353	0.692	3	23, 5	Fn.	" "
21	10 42 52	+2 18.64	+ 0 39.3	10 10 46.28	+5 44 53.3	8.733	0.680	4	25, 5	Fn.	" "
21	10 59 56	−1 38.80	+ 1 34.9	10 10 46.10	+5 44 56.4	8.945	0.681	5	25, 5	Fn.	" "
21	11 23 19	−1 50.15	− 6 9.4	10 10 45.41	+5 45 1.1	9.126	0.682	6	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 29. s	′	
1	10 22 27.83	+1.11	+4 31 25.7	−9.7	Albany, A. G. 4042.....	+4	−1.7	Ast. faint; bright Moon. Clouds interrupt.
2	10 21 16.54	+1.11	+4 24 38.2	−9.7	" " 4036.....	+4	−1.7	
3	10 22 42.55	+1.11	+4 47 31.2	−9.7	½ (Albany, A. G. 4046+Leipzig II, A. G. 5485).	+4	−1.7	
4	10 8 26.60	+1.04	+5 44 24.1	−10.1	Leipzig II, A. G. 5398.....	−1	−0.2	
5	10 12 23.85	+1.05	+5 43 31.5	−10.0	" " " 5417.....	−1	−0.1	
6	10 12 34.51	+1.05	+5 51 20.5	−10.0	" " " 5418.....	−1	−0.2	

[1903 NF].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 15	11 27 41	+0 9.94	−9 18.1	5 42 2.00	+9 20 30.4	8.903_n	0.636	1	10, 10	D.	26-inch
15	11 57 25	+0 23.54	−8 40.3	5 42 0.79	+9 20 26.0	8.303_n	0.635	2	10, 10	D.	" "

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[1903 NF]—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 17	12 41 17	−0 18.93	−3 38.5	5 39 59.15	+9 12 50.4	8.946	0.638	3	10, 10	D.	26-inch
18	13 42 8	+2 45.45	+0 22.1	5 38 57.06	+9 9 9.0	9.330	0.650	4	33, 7	D.	" "
18	14 6 10	+3 23.87	−3 44.6	5 38 56.20	+9 9 6.4	9.409	0.655	5	20, 4	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	5 41 47.49	+4.57	+9 29 55.9	−7.4	Leipzig II, A. G. 2399.....	....	.. ....	
2	5 41 32.68	+4.57	+9 29 13.7	−7.4	" " " 2396.....	....	.. ....	
3	5 40 13.50	+4.58	+9 16 36.5	−7.6	" " " 2382.....	....	.. ..	Seeing unst.
4	5 36 7.01	+4.60	+9 8 54.1	−7.2	" " " 2337.....	....	.. ....	
5	5 35 27.73	+4.60	+9 12 58.1	−7.1	" " " 2333.....	....	.. ....	

(532) HERCULINA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 19	12 5 31	+5 25.76	+ 2 58.9	13 33 56.49	+16 34 55.2	9.440	0.565	1	20, 4	Hd.	12-inch
20	9 47 55	−2 54.61	+ 2 40.5	13 33 38.02	+16 27 30.1	8.198	0.523	2	20, 4	Hd.	" "
22	9 20 25	+1 20.39	+ 5 40.4	13 33 2.13	+16 10 34.2	8.378_n	0.528	3	20, 4	Hd.	" "
23	9 56 31	+3 30.68	− 0 13.2	13 32 45.66	+16 1 28.9	8.777	0.532	4	25, 5	Hd.	" "
25	8 49 36	+2 49.31	− 2 3.9	13 32 19.25	+15 43 28.3	8.790_n	0.538	5	30, 6	Hd.	" "
27	10 28 4	+1 15.60	+ 0 30.4	13 31 57.63	+15 23 34.6	9.195	0.554	6	30, 6	Hd.	" "
28	8 57 8	−2 56.08	+ 1 13.7	13 31 50.14	+15 14 17.3	8.315_n	0.545	7	30, 6	Hd.	" "
29	8 34 32	−0 40.69	+ 3 26.4	13 31 43.87	+15 4 20.7	8.770_n	0.549	8	30, 6	Hd.	" "
June 3	9 9 12	−0 1.48	+ 3 37.8	13 31 33.66	+14 10 59.7	8.727	0.564	9	30, 6	Hd.	" "
8	9 8 53	+1 59.62	− 1 31.1	13 32 1.87	+13 14 8.4	8.962	0.581	10	25, 5	Hd.	" "
11	9 3 27	+0 30.81	− 7 38.8	13 32 36.46	+12 38 29.4	9.012	0.591	11	30, 6	Hd.	" "
12	8 57 44	+2 23.01	− 1 4.2	13 32 50.90	+12 26 28.4	8.995	0.594	12	25, 5	Hd.	" "
15	9 13 11	+0 20.80	+ 2 37.8	13 33 42.93	+11 49 20.6	9.177	0.608	13	9, 2	Hd.	" "
18	9 12 28	−0 4.89	− 2 27.1	13 34 47.64	+11 11 32.9	9.229	0.618	14	30, 6	Hd.	" "
1905											
July 7	12 23 2	−4 54.42	+ 3 22.1	21 36 30.77	−22 51 37.8	9.430_n	0.864	15	20, 4	Hd.	26-inch
8	13 9 42	−3 44.07	− 0 32.7	21 36 0.89	−23 0 12.3	9.231_n	0.880	16	15, 3	Hd.	" "
15	13 43 39	+2 9 61	− 7 49.2	21 32 1.91	−24 0 7.8	8.504_n	0.893	17	25, 5	Hd.	" "
20	11 52 42	+1 29.03	− 9 3.2	21 28 41.69	−24 42 57.7	9.339_n	0.880	18	25, 5	Hd.	" "
26	12 20 31	−0 53.48	+ 1 10.6	21 24 6.11	−25 35 2.7	9.011_n	0.895	19	30, 6	Hd.	" "
30	13 38 49	−2 27.82	− 6 3.2	21 20 45.46	−26 9 14.3	9.050	0.897	20	20, 4	Hd.	" "
30	13 58 56	−4 32.09	− 2 2.3	21 20 44.80	−26 9 19.9	9.192	0.893	21	20, 4	Hd.	" "
Aug. 3	11 30 6	+3 5.92	+ 3 24.2	21 17 24.81	−26 40 57.4	9.115_n	0.897	22	25, 5	Hd.	" "
6	12 2 34	−0 20.25	− 0 45.8	21 14 46.57	−27 4 27.2	8.428_n	0.904	23	18, 6	Hd.	" "
15	12 5 58	−0 45.24	− 7 18.0	21 6 57.04	−28 7 25.8	8.894	0.905	24	30, 6	Hd.	" "
17	10 42 57	−1 23.52	− 2 8.3	21 5 18.86	−28 19 25.7	8.944_n	0.906	25	25, 5	Hd.	" "
18	10 31 31	+0 47.10	+ 3 51.7	21 4 29.44	−28 25 22.0	9.012_n	0.905	26	25, 5	Hd.	" "
22	9 42 53	−2 3.85	+ 3 53.0	21 1 17.38	−28 47 15.3	9.227_n	0.900	27	25, 5	Hd.	" "
22	10 7 17	−3 36.01	+ 4 56.7	21 1 16.56	−28 47 23.7	9.061_n	0.905	28	25, 5	Hd.	" "
30	9 32 23	−1 47.53	+ 5 31.0	20 55 29.48	−29 23 15.6	9.044_n	0.907	29	28, 6	Hd.	" "
31	9 42 0	−3 42.50	+ 4 3.8	20 54 50.17	−29 26 59.4	8.895_n	0.910	30	20, 4	Hd.	" "
Sept. 6	9 37 40	+2 18.22	+ 0 20.8	20 51 21.21	−29 45 35.4	8.427_n	0.912	31	30, 6	Hd.	" "

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(532) HERCULINA—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 6	12 40 52	+1 41.58	+ 5 26.8	2 7 44.08	−11 56 27.0	8.740$_n$	0.812	32	25,5	Fn.	26-inch
15	12 48 52	+1 8.32	+ 0 38.2	2 0 43.29	−12 44 33.0	8.682	0.837	33	19,4	R.	12-inch
26	10 31 53	−3 46.45	+ 1 0.8	1 51 37.30	−13 24 48.8	9.094$_n$	0.838	34	15,3	R.	" "
29	9 57 45	+0 1.03	+10 39.2	1 49 9.15	−13 31 38.2	9.213$_n$	0.836	35	30,6	R.	" "
29	10 37 38	+1 59.93	+ 9 58.3	1 49 7.75	−13 31 45.3	8.925$_n$	0.840	36	25,5	R.	" "
29	11 9 44	+3 23.70	−10 47.9	1 49 6.68	−13 31 47.1	8.270$_n$	0.842	37	20,4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Eph. by Hd. from elements in Appendix I.		
	h m s	s	° ′ ″	″		s	′ ″	
1	13 28 28.86	+1.87	+16 31 59.3	− 3.0	Berlin A, A. G. 4953	+ 0.16	−0 2.2	Seeing unst.
2	13 36 30.74	+1.89	+16 24 52.3	− 2.7	" " " 4984	0.00	−0 1.8	Seeing fair.
3	13 31 39.87	+1.87	+16 4 56.4	− 2.6	" " " 4967	+ 0.15	−0 1.2	Seeing fine.
4	13 29 13.12	+1.86	+16 1 44.7	− 2.6	" " " 4958	+ 0.01	+0 0.6	Seeing good.
5	13 29 28.09	+1.85	+15 45 34.5	− 2.3	" " " 4960	0.00	+0 0.6	Seeing good.
6	13 30 40.19	+1.84	+15 23 6.2	− 2.0	" " " 4966	+ 0.08	+0 2.2	Seeing very unst. and poor.
7	13 34 44.36	+1.86	+15 13 5.4	− 1.8	" " " 4975	+ 0.05	+0 2.9	Seeing good.
8	13 32 22.72	+1.84	+15 0 56.1	− 1.8	" " " 4969	+ 0.27	+0 4.9	Seeing very unst. and poor.
9	13 31 33.33	+1.81	+14 7 23.5	− 1.6	Leipzig I, A. G. 4886	0.00	+0 5.0	Seeing good.
10	13 30 0.47	+1.78	+13 15 40.7	− 1.2	" " " 4880	+ 0.05	+0 9.6	Seeing fair.
11	13 32 3.88	+1.77	+12 46 9.0	− 0.8	" " " 4888	− 0.05	+0 10.5	Seeing fine.
12	13 30 26.14	+1.75	+12 27 33.5	− 0.9	" " " 4882	− 0.04	+0 14.5	Seeing good.
13	13 33 20.38	+1.75	+11 46 43.6	− 0.8	" " " 4895	− 0.18	+0 15.6	Seeing good; clouds interrupt.
14	13 34 50.80	+1.73	+11 14 0.6	− 0.6	" " " 4904	− 0.05	+0 18.7	Seeing good.
15	21 41 23.04	+2.15	−22 55 18.1	+18.2	Cordoba Gen. Cat. 29773	− 0.66	−0 15.0	Seeing good; est. mag. 9.5.
16	21 39 42.77	+2.19	−22 59 57.8	+18.2	" " " 29745	− 0.53	−0 14.7	Seeing good; clouds interrupt.
17	21 29 49.90	+2.40	−23 52 37.3	+18.7	" " " 29554	− 0.67	−0 14.4	Seeing bad.
18	21 27 10.14	+2.52	−24 34 13.2	+18.7	" " " 29497	− 0.62	−0 13.0	Seeing fair.
19	21 24 56.95	+2.64	−25 36 32.1	+18.8	" " " 29469	− 0.44	−0 13.7	Seeing good.
20	21 23 10.56	+2.72	−26 3 29.9	+18.8	" " " 29420	− 0.63	−0 15.7	Seeing fair.
21	21 25 14.18	+2.71	−26 7 36.5	+18.9	" " " 29473	− 0.55	−0 14.5	Seeing fair.
22	21 14 16.11	+2.78	−26 44 39.8	+18.2	Paris 30036	− 0.65	−0 14.5	Seeing good; star has a faint companion s. pr.
23	21 15 3.98	+2.84	−27 3 59.6	+18.2	Cordoba Gen. Cat. 29259	− 0.74	−0 15.0	Seeing poor.
24	21 7 39.34	+2.94	−28 0 25.3	+17.5	" " " 29093	− 0.63	−0 13.8	Seeing poor.
25	21 6 39.43	+2.95	−28 17 34.7	+17.3	" " " 29068	− 0.56	−0 12.5	Seeing poor.
26	21 3 39.38	+2.96	−28 29 30.7	+17.0	" " " 29001	− 0.49	−0 14.5	Seeing fair.
27	21 3 18.26	+2.97	−28 51 25.0	+16.7	" " " 28992	− 0.65	−0 9.7	Seeing good.
28	21 4 49.60	+2.97	−28 52 37.1	+16.7	" " " 29030	− 0.65	−0 12.8	Seeing good.
29	20 57 14.03	+2.98	−29 29 2.2	+15.6	" " " 28831	− 0.43	−0 11.9	Seeing bad.
30	20 58 29.70	+2.97	−29 31 18.8	+15.6	" " " 28863	− 0.47	−0 11.7	Seeing good.
31	20 49 0.06	+2.93	−29 46 10.8	+14.6	" " " 28668	− 0.61	−0 13.5	Seeing fair.
						Unpub. eph. by Hd.		
32	2 5 59.94	+2.56	−12 2 8.1	+14.3	Camb., U. S., A. G. Zones	−11.15	−1 14.5	Est. mag. 9.3.
33	1 59 32.30	+2.67	−12 45 25.0	+13.8	" " " "	−11.19	−1 13.0	Seeing fair to poor; est. mag. 9.6.
34	1 55 21.01	+2.74	−13 26 2.4	+12.8	" " " "	−11.44	−1 11.0	Seeing good; thin clouds.
35	1 49 5.37	+2.75	−13 42 29.8	+12.4	½ (Wash., A. G. 484+Camb., U. S., A. G. Zones).	−11.43	−1 8.4	Seeing fair.
36	1 47 5.06	+2.76	−13 41 56.1	+12.5	½ (Wash., A. G. 469+Camb., U. S., A. G. Zones).	−11.45	−1 9.9	Seeing fair; bright Moon.
37	1 45 40.22	+2.76	−13 21 11.8	+12.6	Camb., U. S., A. G. Zones	−11.39	−1 9.2	Seeing fair.

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(536) MERAPI.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 12	14 4 49	−1 3.56	+2 31.6	15 55 40.19	−19 8 30.5	9.275	0.861	1	29, 6	D.	26-inch
13	12 53 24	−1 50.46	+1 10.2	15 54 53.30	−19 9 51.9	8.717	0.871	2	29, 6	D.	" "
13	13 14 42	+1 37.94	+6 11.0	15 54 52.91	−19 9 52.5	8.985	0.869	3	30, 6	D.	" "
15	12 39 42	−0 0.58	+3 25.3	15 53 14.42	−19 12 38.2	8.637	0.872	4	10, 10	D.	" "
19	12 27 20	−3 22.00	−2 3.2	15 49 53.05	−19 18 6.8	8.759	0.872	5	17, 4	D.	" "
20	10 59 15	−4 9.68	−3 18.2	15 49 5.38	−19 19 21.9	9.072_n	0.868	6	15, 3	D.	" "
1906											
Oct. 13	13 9 59	−3 45.73	−8 29.4	2 23 38.38	− 1 44 54.1	8.443	0.756	7	14, 3	Hd.	26-inch
29	12 44 40	−1 3.06	−2 26.3	2 10 20.10	− 1 45 46.3	9.106	0.756	8	29, 6	R.	" "
29	13 5 35	+0 29.58	−7 39.5	2 10 19.28	− 1 45 46.5	9.224	0.755	9	25, 5	R.	" "
Nov. 1	10 43 45	−1 57.51	−4 51.7	2 7 52.21	− 1 42 59.0	8.922_n	0.756	10	25, 5	R.	" "
1	11 16 56	−3 32.14	+0 23.5	2 7 51.04	− 1 42 56.8	8.243_n	0.756	11	20, 4	R.	" "
1907											
Dec. 25	11 4 26	+1 26.63	+5 11.4	6 43 24.90	+39 18 3.3	9.330_n	9.316	12	25, 5	Hd.	26-inch
27	8 50 24	+2 45.54	−1 25.1	6 41 33.68	+39 26 28.7	9.671_n	0.201	13	25, 5	Hd.	" "
27	8 50 24	+1 59.07	+2 59.6	6 41 33.79	+39 26 25.7	9.671_n	0.201	14	25, 5	Hd.	" "
1908											
Jan. 2	9 58 50	−0 21.55	+4 36.5	6 35 35.55	+39 49 28.9	9.444_n	9.532	15	12, 4	Fn.	26-inch
2	10 5 37	−0 38.33	+5 59.5	6 35 35.30	+39 49 30.4	9.418_n	9.448	16	15, 5	Fn.	" "
9	8 41 43	+0 27.50	+1 52.7	6 28 50.57	+40 9 10.5	9.572_n	9.873	17	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		m s	′	
1	15 56 41.17	+2.58	−19 11 2.8	+ 0.7	Cincinnati 1885, 2690	.. ..	....	
2	15 56 41.17	+2.59	−19 11 2.8	+ 0.7	" " 2690	.. ..	....	Seeing very steady.
3	15 53 12.38	+2.59	−19 16 4.0	+ 0.5	" " 2683	.. ..	....	Seeing very steady.
4	15 53 12.38	+2.62	−19 16 4.0	+ 0.5	" " 2683	.. ..	....	Seeing unst.
5	15 53 12.38	+2.67	−19 16 4.0	+ 0.4	" " 2683	.. ..	....	Seeing fuzzy.
6	15 53 12.38	+2.68	−19 16 4.0	+ 0.3	" " 2683	.. ..	....	Seeing fuzzy; poor obs'n.
						Veröff. 30.		
7	2 27 21.40	+2.71	− 1 36 37.3	+12.6	Nicolajew, A. G. 513	−1 13	−13.9	Est. mag. 11.5.
8	2 11 20.29	+2.87	− 1 43 32.5	+12.5	" " 450	−1 13	−13.8	Seeing fair; bright Moon.
9	2 9 46.78	+2.92	− 1 38 19.5	+12.5	" " 445	−1 13	−13.8	Seeing fair; thin clouds.
10	2 9 46.78	+2.94	− 1 38 19.5	+12.2	" " 445	−1 14	−13.8	Seeing diffuse, unst.; ast. faint.
11	2 11 20.29	+2.89	− 1 43 32.5	+12.2	" " 450	−1 14	−13.8	Seeing diffuse, unsteady; ast. faint.
						Veröff. 32.		
12	6 41 53.85	+4.42	+39 12 59.1	− 7.2	Lund, A. G. 3517	+0 40	+ 2.2	Seeing very poor.
13	6 38 43.67	+4.47	+39 28 0.4	− 6.6	" " 3488	+0 40	+ 2.3	Seeing fair.
14	6 39 30.26	+4.46	+39 23 32.8	− 6.7	" " 3495	+0 40	+ 2.3	Seeing fair.
15	6 35 56.69	+0.41	+39 44 55.1	− 2.7	" " 3449	+0 38	+ 2.5	
16	6 36 13.22	+0.41	+39 43 33.6	− 2.7	" " 3455	+0 38	+ 2.5	
17	6 28 22.58	+0.49	+40 7 19.3	− 1.5	½ (Lund, A. G. 3371 + Bonn, A. G. 5345)	+0 39	+ 2.9	

(543) CHARLOTTE.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 13	9 33 24	−1 10.74	−3 29.8	8 31 35.79	+15 24 14.4	9.237_n	0.557	1	25, 5	Fn.	26-inch
13	9 48 14	−1 6.21	+2 50.6	8 31 35.26	+15 24 13.2	9.157_n	0.552	2	25, 5	Fn.	" "

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(543) CHARLOTTE—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 22	11 42 49	+3 31.54	−1 55.1	8 25 8.65	+15 31 17.4	9.242	0.555	3	25, 5	Fn.	26-inch
22	12 3 2	−2 20.20	−4 9.3	8 25 7.82	+15 31 18.1	9.328	0.563	4	25, 5	Fn.	" "
22	12 33 24	−1 54.38	−7 29.9	8 25 7.07	+15 31 18.9	9.427	0.578	5	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 29. s	′	
1	8 32 45.56	+0.97	+15 27 53.8	−9.6	Berlin A, A. G. 3436.....	−41	+2.9	
2	8 32 40.50	+0.97	+15 21 32.2	−9.6	" " " 3435.....	−41	+2.9	
3	8 21 36.18	+0.93	+15 33 22.2	−9.7	" " " 3335.....	−40	+2.7	
4	8 27 27.08	+0.94	+15 35 37.0	−9.6	" " " 3390.....	−40	+2.7	
5	8 27 0.51	+0.94	+15 38 58.4	−9.6	" " " 3385.....	−40	+2.7	

(550) SENTA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Feb 16	10 52 46	+0 16.79	−4 7.6	9 42 58.93	+0 36 36.8	9.109$_n$	0.735	1	20, 4	Fn.	26-inch
16	11 11 30	−2 26.97	+4 18.7	9 42 58.26	+0 36 41.4	8.964$_n$	0.734	2	25, 5	Fn.	" "
23	11 53 23	+0 40.90	+6 49.6	9 36 37.54	+1 2 16.6	8.767	0.730	3	25, 5	Fn.	" "
Mar. 5	9 47 57	+2 37.50	+3 29.9	9 28 22.94	+1 43 29.4	8.984$_n$	0.724	4	23, 5	Fn.	" "
5	10 12 6	−2 44.81	+2 28.4	9 28 22.11	+1 43 32.8	8.687$_n$	0.723	5	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		Veröff. 29. s	′	
1	9 42 41.07	+1.07	+0 40 54.0	− 9.6	Nicolajew, A. G. 2937.....	+36	−4.5	Seeing excellent.
2	9 45 24.16	+1.07	+0 32 32.3	− 9.6	" " 2948.....	+36	−4.5	Seeing excellent.
3	9 35 55.55	+1.09	+0 55 37.4	−10.4	½ (Nicolajew, A. G. 2914+Albany, A. G. 3845).	+35	−4.6	
4	9 25 44.39	+1.05	+1 40 10.7	−11.2	Albany, A. G. 3797.....	+32	−4.7	
5	9 31 5.86	+1.06	+1 41 15.5	−11.1	" " 3823.....	+32	−4.7	

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(554) PERAGA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 10	9 51 41	−3 13.13	−1 56.6	7 59 26.98	+19 27 28.4	8.983$_n$	0.469	1	22, 5	Hd.	12-inch
14	9 52 42	+4 27.69	+3 35.5	7 56 34.55	+19 30 21.8	8.741$_n$	0.464	2	25, 5	Hd.	" "
15	10 10 23	+3 43.56	+7 17.7	7 55 55.51	+19 30 54.4	7.898$_n$	0.461	3	25, 5	Hd.	" "
17	10 28 29	+5 20.97	+2 7.4	7 54 44.27	+19 31 45.2	8.696	0.463	4	20, 4	Hd.	26-inch
18	10 18 15	+3 51.30	−4 44.0	7 54 12.20	+19 32 5.1	8.573	0.462	5	25, 5	Hd.	" "
24	11 18 4	+3 38.73	+5 32.0	7 51 39.86	+19 32 32.3	9.327	0.494	6	30, 6	Hd.	12-inch
26	10 34 48	+4 40.28	−1 47.1	7 51 6.69	+19 32 10.1	9.157	0.476	7	23, 5	Hd.	" "
1906											
Apr. 23	12 54 49	−1 17.59	+2 15.4	16 5 29.13	−24 49 10.9	9.150$_n$	0.889	8	25, 5	Fn.	26-inch
23	13 8 18	+0 5.67	+3 8.2	16 5 28.48	−24 49 11.4	9.052$_n$	0.892	9	20, 4	Fn.	" "
27	12 43 23	−2 32.85	+0 47.0	16 2 28.10	−24 42 51.1	9.100$_n$	0.890	10	25, 5	Fn.	" "
May 4	13 35 36	+1 3.56	+4 0.8	15 56 21.57	−24 27 33.3	8.789	0.893	11	25, 5	Fn.	" "
4	13 51 5	−1 56.81	+0 26.4	15 56 20.89	−24 27 32.2	8.978	0.892	12	25, 5	Fn.	" "
10	12 7 30	+2 17.57	+4 24.9	15 50 36.21	−24 10 46.0	8.826$_n$	0.892	13	25, 5	Fn.	" "
20	12 10 2	−2 36.17	−2 45.6	15 40 18.06	−23 35 23.9	8.670	0.890	14	25, 5	Fn.	" "
22	12 15 30	+3 28.13	+3 16.9	15 38 13.45	−23 27 30.9	8.903	0.889	15	25, 5	Fn.	" "
23	12 53 7	+2 58.52	+1 41.8	15 37 9.92	−23 23 21.7	9.230	0.881	16	25, 5	Fn.	" "
23	13 22 36	+3 4.18	+6 24.7	15 37 8.71	−23 23 15.6	9.359	0.873	17	25, 5	Fn.	" "
1907											
Aug. 30	11 48 17	−0 18.92	+0 21.9	23 38 49.57	+ 2 10 44.6	9.182$_n$	0.720	18	24, 5	Fn.	26-inch
Sept. 6	9 46 55	−0 38.86	+2 22.8	23 33 5.24	+ 1 46 49.4	9.482$_n$	0.727	19	25, 5	Fn.	" "
11	10 30 47	−1 9.92	−4 17.5	23 28 30.47	+ 1 25 15.8	9.277$_n$	0.728	20	25, 5	Fn.	" "
13	9 50 41	+3 39.58	−6 41.8	23 26 39.60	+ 1 16 2.7	9.385$_n$	0.730	21	25, 5	Fn.	" "
20	9 53 15	−2 7.62	−3 46.7	23 20 4.75	+ 0 41 16.9	9.250$_n$	0.734	22	25, 5	Fn.	" "
20	10 11 15	−2 27.36	+4 14.8	23 20 4.03	+ 0 41 12.6	9.158$_n$	0.734	23	25, 5	Fn.	" "
29	12 40 6	−1 35.15	−6 45.5	23 12 1.68	− 0 5 29.7	9.357	0.741	24	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						Eph. by Fn. from elements in Appendix I.		
	h m s	s	° ′ ″	″		s	′ ″	
1	8 2 38.84	+1.27	+19 29 36.5	−11.5	Berlin A, A. G. 3202	− 0.22	0 0.0	Seeing good.
2	7 52 5.62	+1.24	+19 26 57.7	−11.4	" " " 3120	− 0.16	+0 1.8	Seeing good.
3	7 52 10.71	+1.24	+19 23 48.1	−11.4	" " " 3124	− 0.38	+0 1.7	Ast. very faint; bright Moon.
4	7 49 22.08	+1.22	+19 29 49.2	−11.4	Battermann 1895, 455	− 0.30	−0 0.6	Seeing good.
5	7 50 19.68	+1.22	+19 37 0.4	−11.3	Berlin A, A. G. 3100	− 0.19	+0 1.0	Good obs'n.
6	7 47 59.97	+1.16	+19 27 11.3	−11.0	" " " 3078	− 0.20	−0 0.9	Seeing excellent.
7	7 46 25.27	+1.14	+19 34 8.2	−11.0	" " " 3067	− 0.10	+0 0.3	Seeing good.
8	16 6 45.17	+1.55	−24 51 29.0	+ 2.7	Cordoba Zones XVI^h, 364	+36.78	−1 13.1	
9	16 5 21.25	+1.56	−24 52 22.2	+ 2.6	" " XVI^h, 260	+36.56	−1 14.5	
10	16 4 59.31	+1.64	−24 43 40.5	+ 2.4	" " XVI^h, 236	+37.29	−1 18.7	
11	15 55 16.23	+1.78	−24 31 35.4	+ 1.3	" " XV^h, 3745	+38.30	−1 25.3	
12	15 58 15.92	+1.78	−24 28 0.0	+ 1.4	" " XV^h, 3963	+38.24	−1 25.8	
13	15 48 16.76	+1.88	−24 15 11.5	+ 0.6	Cape 1890, 1885	+39.08	−1 33.8	Ast. faint; bright Moon.
14	15 42 52.25	+1.98	−23 32 38.0	− 0.3	Cordoba Gen. Cat. 21408	+38.88	−1 44.3	
15	15 34 43.32	+2.00	−23 30 47.0	− 0.8	" " " 21234	+38.65	−1 48.9	
16	15 34 9.39	+2.01	−23 25 2.5	− 1.0	" " " 21222	+38.50	−1 49.0	Seeing excellent.
17	15 34 2.52	+2.01	−23 29 39.4	− 0.9	" " " 21216	+38.52	−1 48.1	Seeing excellent.
18	23 39 6.20	+2.29	+ 2 10 8.2	+14.5	Albany, A. G. 8145	−19.91	−2 4.6	Est. mag. 11.0.
19	23 33 41.73	+2.37	+ 1 44 11.2	+15.4	" " 8128	−19.83	−2 7.7	
20	23 29 37.98	+2.41	+ 1 29 17.6	+15.7	" " 8110	−20.09	−2 11.4	
21	23 22 57.59	+2.43	+ 1 22 28.6	+15.9	½ (Albany, A. G. 8081 + Nicolajew, A. G. 5829).	−20.34	−2 14.5	

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(554) PERAGA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Eph. by Fn. from elements in Appendix I.		
	h m s	s	° ′ ″	″		s	′ ″	
22	23 22 9.91	+2.46	+0 44 47.2	+16.4	Newcomb's Fund. Cat. 1552	−20.32	−2 14.9	Est. mag. 10.3.
23	23 22 28.93	+2.46	+0 36 41.4	+16.4	Nicolajew, A. G. 5827.....	−20.31	−2 15.2	
24	23 13 34.38	+2.45	+0 0 59.1	+16.7	" " 5805.....	−20.19	−2 11.6	

(563) SULEIKA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 29	12 11 50	−2 49.65	−10 55.8	2 54 49.73	+2 4 57.4	8.430n	0.720	1	25,5	Fn.	12-inch
Nov. 7	13 49 45	+0 44.72	− 3 42.9	2 46 20.71	+2 10 9.3	9.386	0.722	2	25,5	Fn.	" "
7	14 7 19	+0 44.31	+ 6 24.8	2 46 20.17	+2 10 10.8	9.436	0.723	3	20,4	Fn.	" "
16	11 46 43	−0 22.82	+ 0 32.4	2 38 6.05	+2 31 5.3	8.987	0.716	4	25,5	Fn.	" "
16	12 1 27	+0 54.16	+ 1 45.0	2 38 5.66	+2 31 10.6	9.099	0.716	5	25,5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						A. N. 4203.		
	h m s	s	° ′ ″	″		s	′	
1	2 57 36.63	+2.75	+2 15 41.7	+11.5	Albany, A. G. 863.....	+6	+10.9	Seeing good.
2	2 45 33.15	+2.84	+2 13 40.8	+11.4	" " 788.....	+5	+ 8.4	Seeing fair.
3	2 45 33.02	+2.84	+2 3 34.6	+11.4	" " 787.....	+5	+ 8.4	Seeing fair.
4	2 38 25.98	+2.89	+2 30 21.5	+11.4	" " 756.....	+6	+ 5.6	Seeing good.
5	2 37 8.61	+2.89	+2 29 14.2	+11.4	" " 750.....	+6	+ 5.6	Seeing good.

(568) CHERUSKIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 5	10 30 1	−1 48.15	−0 45.9	6 57 17.97	+5 15 19.2	9.240n	0.700	1	25,5	Fn.	26-inch
5	10 50 26	−1 57.25	−5 41.5	6 57 17.28	+5 15 14.8	9.131n	0.688	2	25,5	Fn.	" "
10	11 24 0	+2 11.41	+9 12.1	6 52 23.53	+4 53 37.3	8.311n	0.690	3	25,5	Hd.	" "
10	11 35 45	−0 1.49	−2 36.9	6 52 23.06	+4 53 35.2	7.492	0.690	4	25,5	Hd.	" "

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(568) CHERUSKIA—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		Veröff. 31. s	′	
1	6 59 5.61	+0.51	+5 16 11.1	−6.0	Leipzig II, A. G. 3475.....	+9	−0.5	
2	6 59 14.02	+0.51	+5 21 2.3	−6.0	" " " 3479.....	+9	−0.5	
3	6 50 11.56	+0.56	+4 44 32.1	−6.9	Albany, A. G. 2498.....	+9	−0.5	Seeing fair.
4	6 52 23.99	+0.56	+4 56 18.9	−6.8	½ (Albany, A. G. 2521+Leipzig II, A. G. 3379).	+9	−0.5	Seeing fair.

(581) TAUNTONIA.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 11	11 41 6	−1 30.04	−1 7.4	12 19 57.66	+29 43 12.5	9.276n	0.205	1	25, 5	Hd.	26-inch
20	10 23 46	+1 9.22	+4 37.0	12 13 15.41	+30 39 31.1	9.423n	0.230	2	20, 4	Hd.	" "
20	10 34 49	−1 37.05	−1 26.7	12 13 15.37	+30 39 30.1	9.384n	0.209	3	20, 4	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. N. 4156. s	′	
1	12 21 26.76	+0.94	+29 44 27.2	−7.3	½ (Leiden, A. G. 4673+Camb., Eng., A. G. 6112).	+55	−3.7	Est. mag. 13.5.
2	12 12 5.15	+1.04	+30 34 59.8	−5.7	Leiden, A. G. 4638.....	+55	−3.5	Star double; used mean.
3	12 14 51.38	+1.04	+30 41 2.6	−5.8	" " 4646.....	+56	−3.5	

(588) ACHILLES.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 6	13 23 1	+0 12.72	+3 1.2	11 49 39.93	−6 55 29.9	9.206n	0.795	1	6, 6	Hd.	26-inch
11	12 38 7	−1 29.68	−2 56.1	11 48 0.02	−6 54 56.7	9.310n	0.792	2	12, 4	Hd.	" "
15	12 44 44	+0 54.43	−1 24.2	11 46 29.03	−6 52 58.8	9.205n	0.794	3	18, 5	Hd.	" "
Mar. 6	11 54 24	+0 33.05	−1 39.1	11 37 42.06	−6 27 18.9	8.983n	0.794	4	9, 2	Hd.	" "
15	12 35 51	−1 55.48	−1 57.9	11 33 2.26	−6 7 28.3	8.826	0.792	5	25, 5	Fn.	" "
20	12 49 11	−0 3.85	+3 42.9	11 30 27.04	−5 55 5.7	9.135	0.788	6	30, 6	Fn.	" "

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(588) ACHILLES—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						A. N. 4155.		
	h m s	s	° ′ ″	″		s	′	
1	11 49 26.71	+0.50	−6 58 29.9	−1.2	Wien-Ottakring, A. G. 4410.....	−49	+6.4	Est. mag. 14–15.
2	11 49 29.10	+0.60	−6 51 58.4	−2.2	" " " 4411.....	−50	+6.7	Ast. very faint.
3	11 45 33.92	+0.68	−6 51 31.7	−2.9	" " " 4396.....	−51	+6.8	
4	11 37 8.06	+0.95	−6 25 34.1	−5.7	" " " 4350.....	−53	+7.4	Clouds interrupt.
5	11 34 56.73	+1.01	−6 5 23.7	−6.7	Straszburg, A. G. 4375.....	−53	+7.5	Est. mag. 14.0.
6	11 30 29.87	+1.02	−5 58 41.4	−7.2	" " 4355.....	−52	+7.6	

(599) [1906 UJ].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 28	11 38 40	−0 47.06	+11 22.5	14 40 12.29	−13 10 54.4	8.873$_n$	0.839	1	25, 5	Fn.	26-inch
29	13 6 9	−1 57.46	+ 9 19.6	14 39 6.04	−13 11 1.7	9.057	0.837	2	25, 5	Hd.	" "
May 3	15 9 22	+4 15.96	− 9 35.1	14 34 48.08	−13 11 26.4	9.556	0.803	3	20, 4	Fn.	" "
4	10 48 18	+3 24.16	− 9 41.5	14 33 56.29	−13 11 32.8	9.064$_n$	0.837	4	20, 4	Hd.	" "
9	10 28 56	+0 9.47	− 4 44.4	14 28 40.02	−13 12 19.0	9.020$_n$	0.838	5	25, 5	Hd.	" "
10	10 38 26	+1 15.54	− 0 47.2	14 27 36.58	−13 12 28.5	8.879$_n$	0.839	6	25, 5	Fn.	" "
16	10 31 12	+2 54.72	+ 2 30.6	14 21 27.83	−13 14 22.7	8.474$_n$	0.840	7	25, 5	Hd.	" "
18	9 38 1	+2 40.02	+ 3 15.0	14 19 31.45	−13 15 22.4	9.070$_n$	0.837	8	10, 2	Hd.	" "
20	11 1 11	+3 3.90	+ 0 13.6	14 17 32.72	−13 16 27.1	8.857	0.839	9	20, 4	Hd.	" "
22	9 22 25	+1 15.79	− 1 4.1	14 15 44.61	−13 17 44.7	9.041$_n$	0.838	10	25, 5	Hd.	" "
24	9 22 20	+2 16.37	− 1 25.9	14 13 56.23	−13 19 19.4	8.957$_n$	0.839	11	25, 5	Fn.	" "
29	10 9 20	+1 37.36	+ 0 49.0	14 9 43.72	−13 24 22.9	8.734	0.840	12	25, 5	Fn.	" "
June 11	10 15 44	−0 11.12	− 1 24.0	14 1 27.12	−13 46 49.8	9.267	0.835	13	10, 10	Hd.	" "
22	9 36 30	+1 39.98	+ 6 34.8	13 57 47.71	−14 17 42.7	9.300	0.836	14	19, 4	Hd.	" "
25	9 36 52	+1 56.34	+ 1 37.4	13 57 21.16	−14 28 12.0	9.348	0.835	15	25, 5	Hd.	" "
July 6	9 26 28	+0 14.63	+12 16.0	13 57 44.61	−15 14 6.2	9.448	0.830	16	6, 6	Hd.	" "
12	9 36 1	+0 2.98	− 8 20.7	13 59 14.34	−15 43 54.7	9.520	0.821	17	8, 8	Hd.	" "
13	9 43 57	−0 33.68	+ 4 1.2	13 59 34.23	−15 49 11.6	9.403	0.837	18	20, 5	Hd.	" "
19	9 42 16	+2 33.90	+11 20.1	14 2 3.48	−16 22 30.6	9.575	0.810	19	25, 5	Fn.	" "
21	9 38 18	−3 2.66	+ 0 39.0	14 3 3.93	−16 34 15.8	9.579	0.810	20	10, 2	Fn.	" "
1907											
Sept. 29	13 40 33	−1 0.41	− 5 40.6	3 4 45.42	+ 8 44 57.0	9.023$_n$	0.645	21	25, 5	Fn.	26-inch
Oct. 1	12 1 37	+0 17.31	− 3 21.7	3 3 37.75	+ 8 54 16.6	9.432$_n$	0.660	22	18, 6	Fn.	" "
5	13 7 48	+1 46.89	− 4 46.3	3 0 49.96	+ 9 13 31.4	9.064$_n$	0.640	23	25, 5	Fn.	" "
6	12 56 7	−0 58.86	+ 0 12.3	3 0 3.89	+ 9 18 9.8	9.113$_n$	0.640	24	30, 6	Fn.	" "
13	11 26 16	+0 26.17	+ 0 26.2	2 53 51.63	+ 9 50 32.5	9.370$_n$	0.644	25	25, 5	Fn.	" "
Nov. 3	9 48 25	+0 19.71	+ 1 45.1	2 29 44.64	+11 25 48.2	9.342$_n$	0.622	26	30, 6	Fn.	" "
25	11 56 54	+1 22.71	− 5 47.4	2 7 15.08	+13 9 15.9	9.388	0.604	27	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Eph. by Hd. and Fn. from elements in Appendix I.		
	h m s	s	° ′ ″	″		s	′ ″	
1	14 40 57.73	+1.62	−13 22 14.0	−2.9	Camb., U. S., A. G. Zones.....	− 0.03	+0 0.1	
2	14 41 1.87	+1.63	−13 20 18.3	−3.0	" " " "	− 0.04	−0 0.8	Seeing good.
3	14 30 30.47	+1.65	−13 1 47.7	−3.6	" " " "	− 0.21	−0 1.9	
4	14 30 30.47	+1.66	−13 1 47.7	−3.6	" " " "	− 0.27	−0 1.4	Seeing fair.
5	14 28 28.87	+1.68	−13 7 31.0	−3.6	" " " "	− 0.30	−0 1.7	Seeing poor.
6	14 26 19.35	+1.69	−13 11 37.5	−3.8	" " " "	− 0.35	+0 1.6	
7	14 18 31.41	+1.70	−13 16 49.0	−4.3	" " " "	− 0.02	+0 0.1	Seeing excellent.
8	14 16 49.73	+1.70	−13 18 33.0	−4.4	" " " "	− 0.06	−0 5.0	Seeing poor; clouds interrupt.

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(599) [1906 UJ]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
						Eph. by Hd. and Fn. from elements in Appendix I.		
	h m s	s	° ′ ″	″		s	′ ″	
9	14 14 27.13'	+1.69	−13 16 36.3	− 4.4	Camb., U. S., A. G. Zones.....	+ 0.12	−0 0.6	Seeing bad; star double; used fol. component.
10	14 14 27.13	+1.69	−13 16 36.3	− 4.3	" " " "	+ 0.09	−0 1.3	Seeing fair; est. mag. 12.2; used fol. component of double.
11	14 11 38.18	+1.68	−13 17 49.0	− 4.5	" " " "	− 0.10	−0 2.3	Good obs'n.
12	14 8 4.69	+1.67	−13 25 7.2	− 4.7	½ (Radcliffe 1890, 3676+Camb., U. S., A. G. Zones).	− 0.03	+0 0.3	Seeing excellent; est. mag. 11.8.
13	14 1 36.65	+1.59	−13 45 20.9	− 4.9	Radcliffe 1890, 3653.....	− 0.59	+0 6.4	
14	13 56 6.23	+1.50	−14 24 12.6	− 4.9	Washington, A. G. 5245.....	− 1.76	+0 19.4	Seeing fair.
15	13 55 23.35	+1.47	−14 29 44.4	− 5.0	" " 5241.....	− 2.26	+0 22.3	Seeing good; est. mag. 13.0.
16	13 57 28.60	+1.38	−15 26 17.5	− 4.7	" " 5248.....	− 4.88	+0 41.7	
17	13 59 10.03	+1.33	−15 35 29.6	− 4.4	" " 5258.....	− 6.53	+0 52.1	Ast. very faint.
18	14 0 6.59	+1.32	−15 53 8.4	− 4.4	" " 5264.....	− 7.08	+0 55.1	Seeing good; est. mag. 13.0.
19	13 59 28.32	+1.26	−16 33 46.4	− 4.3	" " 5261.....	− 9.00	+1 8.8	
20	14 6 5.32	+1.27	−16 34 50.8	− 4.0	" " 5296.....	− 9.86	+1 12.6	
						Eph. by Fn. from elements in Appendix I.		
21	3 5 43.52	+2.31	+ 8 50 27.6	+10.0	Leipzig II, A. G. 1186.....	+19.99	−4 10.3	Est. mag. 11.3; star double; used n. pr. component.
22	3 3 18.08	+2.36	+ 8 57 28.1	+10.2	" " " 1169.....	−20.45	−4 8.7	Est. mag. 11.0
23	2 59 0.61	+2.46	+ 9 18 7.1	+10.6	" " " 1143.....	−21.19	−4 8.9	
24	3 1 0.28	+2.47	+ 9 17 47.0	+10.5	" " " 1155.....	−21.31	−4 11.0	
25	2 53 22.84	+2.62	+ 9 49 55.3	+11.0	" " " 1108.....	−22.37	−4 8.1	
26	2 29 22.02	+2.91	+11 23 50.5	+12.6	Leipzig I, A. G. 745.....	−23.73	−3 49.3	Seeing very poor.
27	2 5 49.41	+2.96	+13 14 49.2	+14.1	" " " 644*.....	−21.42	−4 9.4	Star double; used n. fol. component.

(600) [1906 UM].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
June 22	11 33 30	−1 26.56	− 3 7.1	17 37 32.67	− 9 49 8.7	7.662_n	0.819	1	25, 5	Hd.	26-inch
22	11 33 30	−2 26.53	− 2 43.8	17 37 32.68	− 9 49 7.7	7.662_n	0.819	2	25, 5	Hd.	" "
24	11 44 18	+4 12.19	− 8 55.1	17 35 46.39	− 9 55 12.0	8.566	0.819	3	20, 4	Hd.	" "
25	12 28 51	+3 38.74	−14 33.8	17 34 52.29	− 9 58 32.1	9.131	0.816	4	19, 4	Hd.	" "
30	10 15 53	+4 1.02	+ 6 47.4	17 30 45.29	−10 16 8.1	8.925_n	0.820	5	25, 5	Fn.	" "
July 12	11 35 57	−2 23.45	− 6 9.2	17 22 13.75	−11 10 12.7	9.270	0.820	6	30, 6	Fn.	" "
13	10 56 15	−4 16.28	+ 1 19.0	17 21 40.33	−11 15 11.0	9.075	0.825	7	5, 1	Hd.	" "
15	11 26 57	−1 5.26	+ 9 58.5	17 20 34.63	−11 25 35.5	9.290	0.821	8	33, 7	Hd.	" "
19	12 16 17	+2 32.26	+ 3 42.4	17 18 41.57	−11 47 23.0	9.490	0.808	9	25, 5	Fn.	" "
21	12 29 22	+1 55.59	− 1 1.2	17 17 54.57	−11 58 31.7	9.533	0.803	10	30, 6	Fn.	" "
21	12 57 10	+3 57.12	− 5 33.9	17 17 54.11	−11 58 38.8	9.577	0.794	11	25, 5	Fn.	" "
24	12 42 41	+1 17.47	+ 3 54.7	17 16 56.38	−12 15 43.0	9.575	0.795	12	19, 4	Fn.	" "
26	11 31 43	+0 47.63	− 7 32.1	17 16 26.53	−12 27 9.8	9.457	0.815	13	25, 6	Fn.	" "
26	11 31 43	−1 10.21	− 8 37.8	17 16 26.61	−12 27 9.1	9.457	0.815	14	25, 6	Fn.	" "
1907											
Oct. 24	9 41 30	+2 0.25	+ 1 27.5	1 13 29.49	− 7 0 37.9	9.211_n	0.795	15	30, 6	Fn.	26-inch
29	10 18 10	+1 38.59	− 4 31.8	1 9 48.05	− 7 20 53.9	8.653_n	0.801	16	30, 6	Hd.	" "
30	10 45 4	+2 23.45	+ 4 38.6	1 9 5.49	− 7 24 22.0	8.268	0.802	17	25, 5	Hd.	" "
Nov. 4	10 16 55	+0 28.07	− 4 57.2	1 5 51.09	− 7 38 4.2	7.897	0.803	18	25, 5	Hd.	" "
4	10 26 50	−0 39.01	+ 1 28.6	1 5 50.89	− 7 38 0.7	8.445	0.803	19	25, 5	Hd.	" "

*Corrections of +0s.16, +1″.2, have been applied to Cat. position to reduce from mean to n. fol. component.

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(600) [1906 UM]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
					A. N. 4129.			
1	17 38 57.11	+2.12	− 9 46 7.9	+ 6.3	Wien-Ottakring, A. G. 5982.....	−0.01	+0 0.3	Seeing fair.
2	17 39 57.09	+2.12	− 9 46 30.2	+ 6.3	" " " 5990.....	0.00	+0 1.3	Seeing fair.
3	17 31 32.06	+2.14	− 9 46 23.0	+ 6.1	" " " 5954.....	−0.02	+0 1.9	
4	17 31 11.41	+2.14	− 9 44 4.4	+ 6.1	" " " 5952.....	−0.19	+0 1.0	Seeing good.
5	17 26 42.10	+2.17	−10 23 1.7	+ 6.2	Paris 22274.....	+0.01	−0 0.6	
6	17 24 35.00	+2.20	−11 4 10.1	+ 6.6	" 22209.....	+0.03	−0 1.3	Est. mag. 12.6.
7	17 25 54.41	+2.20	−11 16 36.7	+ 6.7	Camb., U. S., A. G. Zones.....	+0.16	−0 3.5	Seeing good.
8	17 21 37.70	+2.19	−11 35 40.6	+ 6.6	" " " "	+0.13	+0 1.0	Est. mag. 13.0.
9	17 16 7.14	+2.17	−11 51 11.9	+ 6.5	" " " "	+0.14	−0 0.5	Est. mag. 13.0.
10	17 15 56.82	+2.16	−11 57 36.9	+ 6.4	" " " "	+0.07	+0 3.5	
11	17 13 54.84	+2.15	−11 53 11.3	+ 6.4	" " " "	+0.06	+0 2.9	
12	17 15 36.76	+2.15	−12 19 44.1	+ 6.4	" " " "	+0.10	+0 3.8	Ast. very faint; poor obs'n.
13	17 15 36.76	+2.14	−12 19 44.1	+ 6.4	" " " "	0.00	−0 0.6	
14	17 17 34.68	+2.14	−12 18 37.8	+ 6.5	" " " "	+0.08	+0 0.1	Ast. very faint at end of obs'n.
					A. N. 4199.			
						m s	′	
15	1 11 26.63	+2.61	− 7 2 19.7	+14.3	Wien-Ottakring, A. G. 254.....	−3 12	−14.5	
16	1 8 6.84	+2.62	− 7 16 36.1	+14.0	" " " 246.....	−3 9	−14.1	Hazy; ast. faint.
17	1 6 39.43	+2.61	− 7 29 14.5	+13.9	" " " 241.....	−3 8	−14.0	Fine obs'n.
18	1 5 20.41	+2.61	− 7 33 20.4	+13.4	" " " 232.....	−3 5	−13.6	
19	1 6 27.29	+2.61	− 7 39 42.7	+13.4	" " " 240.....	−3 5	−13.5	

[1906 VE].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 12	8 19 49	+0 20.87	+13 16.8	22 51 51.38	+4 4 38.3	9.134n	0.701	1	6, 6	Hd.	26-inch
13	8 9 0	−3 16.08	+11 51.8	22 51 18.80	+4 3 33.9	9.171n	0.701	2	25, 5	Hd.	" "
14	9 48 43	−5 37.55	+ 5 27.2	22 50 45.73	+4 2 33.9	8.761	0.699	3	15, 3	Hd.	" "
15	9 34 40	+1 47.90	− 9 5.7	22 50 16.16	+4 1 42.1	8.585	0.699	4	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	22 51 28.00	+2.51	+3 51 2.1	+19.4	Albany, A. G. 7919.....	....	.. ....	Seeing good; est. mag. 13.0.
2	22 54 32.37	+2.51	+3 51 22.8	+19.3	" " 7933.....	....	.. ....	Seeing good; est. mag. 13.2.
3	22 56 20.77	+2.51	+3 56 47.4	+19.3	" " 7943.....	....	.. ....	Seeing excellent; est. mag. 13.0.
4	22 48 25.78	+2.48	+4 10 28.3	+19.5	" " 7911.....	....	.. ....	Seeing fair; star double; used n. fol. component.

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[1906 VG].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 11	12 5 22	−2 7.17	−4 14.1	0 40 52.02	+2 19 26.9	8.941	0.718	1	25, 5	Fn.	26-inch
12	13 59 37	+0 17.35	+9 44.9	0 40 3.32	+2 15 24.8	9.476	0.723	2	18, 6	Fn.	" "
13	12 12 1	+2 10.62	−1 5.9	0 39 22.55	+2 12 0.0	9.074	0.719	3	25, 5	Fn.	" "
14	12 43 9	+0 0.96	+3 53.1	0 38 37.60	+2 8 15.3	9.269	0.721	4	25, 5	Hd.	" "
15	11 31 41	−0 40.12	+0 29.6	0 37 56.52	+2 4 51.8	8.760	0.720	5	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	0 42 56.43	+2.76	+2 23 24.5	+16.5	Albany, A. G. 199.....	....	.. ....	Seeing much improved; est. mag. 12.6.
2	0 39 43.21	+2.76	+2 5 23.3	+16.6	" " 175.....	....	.. ....	Seeing excellent; est.
3	0 37 9.17	+2.76	+2 12 49.2	+16.7	" " 155.....	....	.. ....	mag. 12.6.
4	0 38 33.88	+2.76	+2 4 5.6	+16.6	" " 170.....	....	.. ....	Est. mag. 12.7.
5	0 38 33.88	+2.76	+2 4 5.6	+16.6	" " 170.....	....	.. ....	Seeing fair; est. mag. 13.0.

(611) [1906 VL].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 11	9 17 29	+0 1.58	−2 41.3	1 11 56.55	+4 31 9.1	9.459_n	0.704	1	30, 6	Fn.	26-inch
12	11 1 48	+3 52.19	−4 8.0	1 11 10.92	+4 21 6.3	8.962_n	0.697	2	20, 4	Fn.	" "
13	10 19 1	+0 34.21	+5 47.6	1 10 29.64	+4 12 0.6	9.218_n	0.700	3	25, 5	Fn.	" "
14	10 53 16	+2 29.23	−0 27.0	1 9 46.27	+4 2 26.4	8.955_n	0.700	4	25, 5	Hd.	" "
15	10 21 34	+2 25.66	−2 40.8	1 9 4.76	+3 53 21.0	9.154_n	0.703	5	25, 5	Hd.	" "
25	12 23 54	−3 12.24	−6 54.2	1 2 13.76	+2 23 23.4	9.271	0.719	6	25, 5	R.	" "
25	13 10 15	−2 12.06	+6 26.8	1 2 12.49	+2 23 5.2	9.427	0.721	7	25, 5	R.	" "
Nov. 2	11 19 54	−3 42.60	+7 58.5	0 57 34.37	+1 20 41.9	9.129	0.728	8	25, 5	R.	" "
13	8 17 53	−1 40.74	−4 37.4	0 52 56.09	+0 12 4.0	9.114_n	0.738	9	5, 1	Fn.	" "
16	7 40 24	−0 7.82	+0 27.9	0 52 5.56	−0 2 38.0	9.247_n	0.741	10	25, 5	Hd.	" "
21	7 33 17	+0 19.78	+5 44.6	0 51 6.88	−0 23 19.6	9.180_n	0.744	11	18, 6	Hd.	" "
22	7 46 7	+0 12.01	+2 11.4	0 50 59.10	−0 26 52.9	9.076_n	0.744	12	8, 8	Fn.	" "
Dec. 11	7 31 42	+0 45.19	+3 8.1	0 52 59.41	−0 55 30.4	7.612_n	0.749	13	25, 5	Fn.	" "
12	7 39 0	+1 59.40	−1 29.7	0 53 19.34	−0 55 5.6	8.248	0.749	14	25, 5	Hd.	" "
18	7 39 37	−1 1.36	+0 13.6	0 55 46.08	−0 49 8.4	8.786	0.748	15	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
						A. N. 4156.		
	h m s	s	° ′ ″	″		s	′ ″	
1	1 11 52.17	+2.80	+4 33 35.0	+15.4	Albany, A. G. 347.....	−0.04	0 0.0	Seeing very poor; est. mag. 12.0.
2	1 7 15.93	+2.80	+4 24 58.6	+15.7	" " 324.....	−0.05	+0 0.4	Seeing excellent; est. mag. 11.8.

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(611) [1906 VL]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
					A. N. 4156.			
3	1 9 52.62	+2.81	+4 5 57.4	+15.6	Albany, A. G. 338	−0.18	−0 1.0	Est. mag. 11.9.
4	1 7 14.23	+2.81	+4 2 37.7	+15.7	" " 323	−0.04	−0 2.2	Seeing becomes unst.; est. mag. 11.8.
5	1 6 36.29	+2.81	+3 55 46.1	+15.7	" " 321	−0.06	−0 1.8	Seeing fair.
6	1 5 23.18	+2.82	+2 30 1.9	+15.7	" " 316	−0.03	−0 3.3	Seeing unst. and diffuse; est. mag. 12.0.
7	1 4 21.73	+2.82	+2 16 22.7	+15.7	" " 308	−0.02	−0 5.3	Seeing poor.
8	1 1 14.17	+2.80	+1 12 28.2	+15.2	Nicolajew, A. G. 210	−0.08	−0 0.4	Seeing very poor; woolly and unst.; star double; used s. fol. component
9	0 54 34.09	+2.74	+0 16 26.7	+14.7	" " 187	+0.01	−0 2.9	
10	0 52 10.66	+2.72	−0 3 20.5	+14.6	" " 175	+0.35	+0 0.8	
11	0 50 44.42	+2.68	−0 29 18.6	+14.4	" " 169	+0.14	+0 0.3	
12	0 50 44.42	+2.67	−0 29 18.6	+14.3	" " 169	−0.02	−0 0.1	
13	0 52 11.70	+2.52	−0 58 51.0	+12.5	" " 176	−1.84	−0 8.6	
14	0 51 17.44	+2.50	−0 53 48.4	+12.5	" " 171	−2.10	−0 8.3	
15	0 56 44.97	+2.47	−0 49 34.0	+12.0	" " 198	−3.37	−0 16.3	

[1906 VM].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 12	12 50 29	−0 39.26	+8 27.4	0 50 20.72	+4 8 53.0	9.214	0.701	1	25, 5	Fn.	26-inch
13	11 7 42	−1 13.73	−1 8.2	0 49 46.25	+3 59 17.4	8.473_n	0.700	2	25, 5	Hd.	" "
14	11 49 29	+4 12.07	+2 12.8	0 49 8.21	+3 48 49.1	8.800	0.702	3	20, 4	Hd.	" "
15	10 59 3	+0 2.08	+4 14.6	0 48 33.96	+3 39 7.3	8.460_n	0.703	4	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	0 50 57.19	+2.79	+4 0 9.3	+16.3	Albany, A. G. 231	....	.. ....	Seeing excellent; est. mag. 12.8.
2	0 50 57.19	+2.79	+4 0 9.3	+16.3	" " 231	....	.. ....	Est. mag. 12.8.
3	0 44 53.36	+2.78	+3 46 19.8	+16.5	" " 211	....	.. ....	Est. mag. 12.5.
4	0 48 29.09	+2.79	+3 34 36.3	+16.4	" " 225	....	.. ....	Seeing fair.

(622) [1906 WP].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 21	10 45 31	+3 17.41	+2 53.6	3 51 16.23	+1 31 4.8	9.106_n	0.726	1	25, 5	Hd.	26-inch

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(622) [1906 WP]—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 22	8 52 1	+2 5.87	−8 30.1	3 50 28.08	+1 30 35.9	9.498$_n$	0.730	2	25,5	Fn.	26-inch
23	10 13 14	+3 17.56	+3 45.2	3 49 32.54	+1 30 17.1	9.232$_n$	0.727	3	18,4	Hd.	" "
24	9 21 38	+0 43.76	+2 13.4	3 48 42.60	+1 30 24.4	9.404$_n$	0.728	4	25,5	Fn.	" "
25	9 33 9	+1 35.64	+4 13.8	3 47 50.64	+1 30 45.5	9.353$_n$	0.727	5	25,5	Hd.	" "
28	10 22 2	−0 56.96	+7 26.4	3 45 18.06	+1 33 57.7	9.035$_n$	0.725	6	25,5	Hd.	" "
Dec. 3	11 6 47	+1 32.19	+7 6.2	3 41 23.32	+1 45 44.9	8.436	0.723	7	25,5	Hd.	" "
4	8 50 9	−1 16.57	−6 27.2	3 40 44.60	+1 48 41.0	9.355$_n$	0.725	8	25,5	Fn.	" "
11	9 53 22	+1 50.82	+3 51.2	3 36 20.98	+2 19 52.7	8.668$_n$	0.717	9	25,5	Fn.	" "
12	8 51 30	+1 59.14	−0 9.8	3 35 51.68	+2 25 10.2	9.200$_n$	0.718	10	15,3	Hd.	" "
18	12 18 2	+3 21.48	+1 50.6	3 33 23.59	+3 4 44.0	9.450	0.716	11	25,5	Fn.	" "
22	10 49 11	+1 46.71	−1 11.2	3 32 29.16	+3 34 31.0	9.194	0.706	12	25,5	Fn.	" "
24	6 52 27	−0 41.92	−0 48.7	3 32 15.21	+3 49 25.0	9.444$_n$	0.710	13	25,5	Fn.	" "
1907											
Jan. 1	8 7 40	+1 1.10	−1 7.7	3 32 35.79	+5 1 17.2	8.930$_n$	0.689	14	25,5	Fn.	26-inch
4	9 3 8	+3 3.66	+6 25.0	3 33 18.40	+5 30 32.7	8.680	0.683	15	25,5	Hd.	" "
10	7 20 3	+0 41.73	+0 45.6	3 35 34.59	+6 30 7.9	9.062$_n$	0.673	16	25,5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						q	δ	
	h m s	s	° ′ ″	″		A. N. 4183. s	′ ″	
1	3 47 55.67	+3.15	+1 28 5.3	+5.9	Albany, A. G. 1131	+0.02	−0 0.4	Est. mag. 11.0.
2	3 48 19.05	+3.16	+1 39 0.1	+5.9	" " 1132	+0.06	+0 1.3	Est. mag. 11.2.
3	3 46 11.82	+3.16	+1 26 26.0	+5.9	" " 1126	−0.07	−0 2.5	
4	3 47 55.67	+3.17	+1 28 5.3	+5.7	" " 1131	−0.03	−0 0.3	
5	3 46 11.82	+3.18	+1 26 26.0	+5.7	" " 1126	−0 06	−0 3.8	
6	3 46 11.82	+3.20	+1 26 26.0	+5.3	" " 1126	−0.14	−0 4.0	
7	3 39 47.90	+3.23	+1 38 33.5	+5.2	" " 1097	−0.16	−0 3.4	Seeing very poor.
8	3 41 57.93	+3.24	+1 55 3.1	+5.1	" " 1112	−0.08	−0 4.5	
9	3 34 26.91	+3.25	+2 15 56.5	+5.0	" " 1060	−0.21	−0 4.2	
10	3 33 49.29	+3.25	+2 25 15.1	+4.9	" " 1053	−0.19	−0 5.1	Clouds interrupt.
11	3 29 58.86	+3.25	+3 2 48.6	+4.8	" " 1028	−0.18	−0 2.0	
12	3 30 39.20	+3.25	+3 35 37.6	+4.6	" " 1032	−0.19	−0 3.5	
13	3 32 53.87	+3.26	+3 50 9.4	+4.3	" " 1045	−0.20	−0 4.6	
14	3 31 34.61	+0.08	+5 2 32.9	−8.0	" " 1033	−0.09	−0 0.6	
15	3 30 14.69	+0.05	+5 24 15.7	−8.0	Leipzig II, A. G. 1317	−0.02	−0 1.3	Seeing good; est. mag.
16	3 34 52.84	+0.02	+6 29 30.4	−8.1	" " " 1346	−0.01	−0 1.0	12.0.

[1906 WR].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 25	12 46 46	+1 52.64	+4 5.1	4 7 38.49	+14 6 10.6	9.058	0.570	1	25,5	Hd.	26-inch

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[1906 WR]—Continued.

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 5 42.42	+3.43	+14 2 0.8	+4.7	Leipzig I. A.G. 1225.....	....	.. ....	Est. mag. 13.5.

(626) [1907 XO].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 11	10 40 1	+3 28.80	−5 51.2	9 45 59.94	+20 56 10.9	8.264	0.429	1	20, 4	Hd.	26-inch
" 16	8 55 35	+3 16.94	−3 51.7	9 41 27.90	+20 33 9.8	9.178_n	0.456	2	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	9 42 30.33	+0.81	+21 2 7.6	−5.5	Berlin B, A. G. 3845.....	....	.. ....	Est. mag. 12.5.
2	9 38 10.19	+0.77	+20 37 6.5	−5.0	" " " 3830.....	....	.. ....	Est. mag. 12.5.

(636) [1907 XP].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 14	10 1 48	+1 19.24	−3 1.2	9 44 45.42	+24 55 36.7	9.424_n	0.403	1	25, 5	Fn.	26-inch
15	9 27 31	−1 0.89	−0 37.7	9 43 53.52	+24 58 55.5	9.503_n	0.438	2	25, 5	Hd.	" "
18	9 7 39	−3 4.74	+0 30.3	9 41 15.44	+25 8 29.2	9.516_n	0.441	3	25, 5	Fn.	" "
22	9 47 38	+2 40.96	−6 47.7	9 37 45.96	+25 19 41.2	9.341_n	0.367	4	18, 4	Hd.	" "
Mar. 2	8 12 9	−1 33.72	+0 6.7	9 31 18.86	+25 35 23.1	9.514_n	0.430	5	25, 5	Fn.	" "
6	9 41 15	+1 18.99	−0 45.7	9 28 18.75	+25 40 5.1	9.060_n	0.314	6	25, 5	Hd.	" "
11	8 22 54	+2 34.68	+3 45.8	9 25 0.91	+25 42 47.0	9.362_n	0.362	7	25, 5	Hd.	" "
15	8 24 52	+0 14.22	+3 29.9	9 22 40.41	+25 42 31.6	9.278_n	0.342	8	18, 5	Hd.	" "
20	7 54 53	+0 35.36	+1 47.6	9 20 12.52	+25 39 15.0	9.313_n	0.351	9	30, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. J. 598. s	′	
1	9 43 25.38	+0.80	+24 58 44.5	−6.6	Camb., Eng., A. G. 5095.....	+0.09	−0 1.0	Est. mag. 12.8.

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(636) [1907 XP]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		A. J. 598. s	′ ″	
2	9 44 53.61	+0.80	+24 59 39.7	−6.5	Camb., Eng., A. G. 5109.....	+0.14	−0 2.4	Seeing excellent; est. mag. 13.0.
3	9 44 19.36	+0.82	+25 8 5.2	−6.3	" " " 5103.....	+0.17	−0 1.9	
4	9 35 4.17	+0.83	+25 26 34.9	−6.0	" " " 5054.....	−0.08	+0 0.6	Ast. too faint to observe well.
5	9 32 51.74	+0.84	+25 35 21.6	−5.2	" " " 5040.....	+0.01	−0 0.6	Est. mag. 13.1.
6	9 26 58.95	+0.81	+25 40 55.6	−4.8	" " " 4998.....	+0.02	−0 1.3	Ast. faint; est. mag. 13.5
7	9 22 25.45	+0.78	+25 39 5.6	−4.4	" " " 4962.....	+0.09	+0 0.2	Est. mag. 13.7.
8	9 22 25.45	+0.74	+25 39 5.6	−3.9	" " " 4962.....	+0.15	+0 2.5	Est. mag. 13.7.
9	9 19 36.48	+0.68	+25 37 30.9	−3.5	" " " 4944.....	+0.11	−0 0.6	Ast. very faint.

[1907 YC].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 15	10 24 43	−1 46.77	+4 21.3	10 56 40.23	+13 44 13.2	9.097$_n$	0.576	1	25, 5	Hd.	26-inch
16	10 32 17	+2 20.99	+2 6.9	10 55 46.82	+13 48 34.6	9.001$_n$	0.573	2	25, 5	Fn.	" "
20	8 54 49	+0 32.50	+0 54.4	10 52 24.11	+14 4 5.5	9.397$_n$	0.593	3	30, 6	Hd.	" "
Apr. 3	10 44 47	+0 47.40	−1 29.6	10 42 18.42	+14 39 36.8	8.990	0.559	4	30, 6	Hd.	" "
14	10 25 53	+4 2.52	−1 20.5	10 37 26.71	+14 43 36.8	9.193	0.565	5	20, 4	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	10 58 26.08	+0.92	+13 39 58.3	−6.4	Leipzig I, A. G. 4179.....	....	.. ....	Est. mag. 12.5.
2	10 53 24.91	+0.92	+13 46 34.1	−6.4	" " " 4163.....	....	.. ....	Est. mag. 13.2; star double; used s. fol. component.
3	10 51 50.70	+0.91	+14 3 17.3	−6.2	" " " 4152.....	....	.. ....	Ast. very faint.
4	10 41 30.20	+0.82	+14 41 11.6	−5.2	" " " 4106.....	....	.. ....	Sky a trifle thick; ast. very faint.
5	10 33 23.49	+0.70	+14 45 1.6	−4.3	½(Leipzig I, A. G. 4073+Berlin A, A. G. 4212).	....	.. ....	Est. mag. 14.2.

[1907 YD].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. Δα	PLANET–STAR. Δδ	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 16	12 21 28	−0 14.14	− 2 49.0	11 25 20.65	−2 32 20.4	8.786	0.763	1	30, 6	Fn.	26-inch

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[1907 YD]—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 20	12 3 26	+3 3.11	−10 53.6	11 22 7.75	−2 16 40.5	8.798	0.761	2	20, 4	Hd.	26-inch
Apr. 3	11 32 32	−0 30.39	+ 7 28.9	11 12 2.66	−1 21 2.2	9.113	0.752	3	25, 5	Hd.	" "
11	10 6 44	+1 10.33	+ 0 19.2	11 7 45.63	−0 53 11.5	8.495	0.748	4	25, 5	Fn.	" "
12	9 51 27	−1 4.97	+ 4 1.8	11 7 19.18	−0 50 4.6	7.976	0.748	5	25, 5	Hd.	" "
17	11 53 48	−2 4.80	+ 5 3.7	11 5 26.61	−0 35 42.5	9.442	0.745	6	25, 5	Hd.	" "
20	11 35 58	+1 31.23	− 0 52.0	11 4 38.28	−0 28 37.4	9.429	0.744	7	25, 5	Fn.	" "
20	11 35 58	+0 59.18	− 8 16.6	11 4 38.33	−0 28 35.2	9.429	0.744	8	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		A. J. 602. s	′ ″	
1	11 25 33.80	+0.99	−2 29 24.5	−6.9	Newcomb's Fund. Cat. 729.....	−0.09	+0 0.3	Est. mag. 12.5.
2	11 19 3.65	+0.99	−2 5 39.6	−7.3	Nicolajew, A.G. 3245.....	−0.18	+0 1.6	
3	11 12 32.11	+0.94	−1 28 23.3	−7.8	Microm. comp. with {3219}* Nicolajew, A.G. {3228}.....	−0.26	0 0.0	Est. mag. 12.5.
4	11 6 34.41	+0.89	−0 53 22.9	−7.8	Nicolajew, A.G. 3197.....	−0.17	−0 0.5	Est. mag. 12.6.
5	11 8 23.26	+0.89	−0 53 58.6	−7.8	" " 3209.....	−0.36	−0 0.1	Haze; ast. very faint; poor obs'n.
6	11 7 30.56	+0.85	−0 40 38.5	−7.7	" " 3204.....	−0.04	−0 0.7	Good obs'n.; est. mag.
7	11 3 6.24	+0.81	−0 27 37.7	−7.7	" " 3185.....	−0.15	−0 0.7	12.5.
8	11 3 38.34	+0.81	−0 20 10.9	−7.7	" " 3187.....	−0.10	+0 1.5	

*Star 3, which is Nicolajew 3220, has considerable proper motion in α. Star 3.—Nicol. 3219=(+0^{m}11^s.65,+1′ 48″.0). Star 3.—Nicol. 3228=(3^{m}7^s.17,−11′ 6″.8).

(637) [1907 YE].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 20	13 52 21	−0 3.14	+3 6.1	11 40 17.31	+2 8 40.5	9.368	0.722	1	30, 6	Fn.	26-inch
Apr. 9	10 4 22	+0 44.37	−4 58.9	11 27 21.78	+3 29 26.0	8.452$_n$	0.705	2	20, 5	Fn.	" "
16	11 7 13	−0 58.79	+5 34.0	11 24 14.43	+3 48 35.9	9.193	0.704	3	12, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	11 40 19.47	+0.98	+2 5 41.2	−6.8	Albany, A.G. 4345.....	....	.. ....	Est. mag. 13.0.
2	11 26 36.46	+0.95	+3 34 31.7	−6.8	" " 4297.....	....	.. ....	Est. mag. 13.7.
3	11 25 12.32	+0.90	+3 43 8.4	−6.5	" " 4296.....	....	.. ....	Haze; ast. very faint

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[1907 ZD].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
May 4	12 52 13	+1 56.83	−0 28.7	13 34 40.85	−7 24 26.9	9.380	0.793	1	30, 6	Fn.	26-inch
9	10 47 27	−2 12.58	−0 39.9	13 30 31.50	−7 24 36.9	8.685	0.802	2	15, 5	Hd.	" "
11	11 6 11	+2 52.36	−2 6.0	13 28 55.57	−7 25 12.7	9.019	0.800	3	23, 5	Hd.	" "
14	9 10 58	−0 43.66	+7 34.6	13 26 43.68	−7 26 40.5	8.991_n	0.801	4	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	13 32 42.75	+1.27	−7 23 52.7	−5.5	Wien-Ottakring, A. G. 4858.....	....	.. ....	Est. mag. 13.0. Star is the s. pr. of a double; mean is given in the Cat.; corrrections −0s.06, −1″.00 have been applied to the Cat.
2	13 32 42.81	+1.27	−7 23 51.7	−5.3	" " " 4858.....	....	.. ....	Haze; est. mag. 13.2.
3	13 26 1.96	+1.25	−7 23 1.3	−5.4	" " " 4820.....	....	.. ....	Quite faint; est. mag. 13.5.
4	13 27 26.08	+1.26	−7 34 9.8	−5.3	" " " 4826.....	....	.. ....	Good obs'n.; est. mag. 13.5.

[1907 ZP].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
May 11	12 9 4	−1 3.03	−1 56.9	15 16 51.37	−8 49 35.5	8.182	0.812	1	30, 6	Hd.	26-inch
12	11 11 24	+1 41.51	+3 15.3	15 16 3.87	−8 45 11.7	8.960_n	0.810	2	25, 5	Hd.	" "
14	10 17 56	−1 50.13	−8 2.8	15 14 26.86	−8 36 29.7	9.242_n	0.805	3	25, 5	Hd.	" "
17	9 37 14	−0 17.93	−6 43.7	15 12 0.56	−8 23 47.2	9.351_n	0.800	4	21, 7	Hd.	" "
21	11 4 13	−0 7.21	+4 6.9	15 8 43.79	−8 7 36.7	8.302_n	0.807	5	8, 8	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	15 17 52.95	+1.45	−8 47 36.2	−2.4	Wien-Ottakring, A. G. 5371.....	....	.. ....	Good obs'n; est. mag. 12.8
2	15 14 20.91	+1.45	−8 48 24.5	−2.5	" " " 5354.....	....	.. ....	Seeing unsteady; est. mag. 12.5.
3	15 16 15.52	+1.47	−8 28 24.5	−2.4	" " " 5362.....	....	.. ....	
4	15 12 17.00	+1.49	−8 17 1.1	−2.4	" " " 5342.....	....	.. ....	Haze and moonlight; ast. faint.
5	15 8 49.49	+1.51	−8 11 41.2	−2.4	" " " 5317.....	....	.. ....	

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(638) [1907 ZQ].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
May 17	10 46 37	+1 29.56	+ 4 4.7	15 28 27.37	−8 3 9.0	9.098$_n$	0.804	1	25, 5	Hd.	26-inch
20	11 3 4	+1 28.28	+ 9 13.2	15 25 49.06	−8 3 26.6	8.809$_n$	0.806	2	25, 5	Hd.	" "
June 6	11 52 28	−2 11.50	−10 16.5	15 12 49.49	−8 29 26.2	9.280	0.803	3	25, 5	Fn.	" "
8	9 21 52	+2 19.64	− 5 7.8	15 11 42.74	−8 34 59.3	8.951$_n$	0.809	4	25, 5	Fn.	" "
15	10 26 48	−3 40.70	+ 2 21.8	15 8 20.92	−9 0 4.1	9.013	0.811	5	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	15 26 56.31	+1.50	−8 7 11.7	−2.0	Wien-Ottakring, A. G. 5421.....	....	.. ....	Seeing good; est. mag. 12.5.
2	15 24 19.26	+1.52	−8 12 37.8	−2.0	" " " 5408.....	....	.. ....	Est. mag. 12.5.
3	15 14 59.41	+1.58	−8 19 8.2	−1.5	" " " 5356.....	....	.. ....	Seeing excellent.
4	15 9 21.53	+1.57	−8 29 49.9	−1.6	" " " 5322.....	....	.. ....	Seeing excellent; est. mag. 12.5.
5	15 12 0.05	+1.57	−9 2 24.5	−1.4	Newcomb's Fund. Cat. 967.....	....	.. ....	Seeing fair.

(645) [1907 AG].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 29	9 28 26	+0 19.81	−4 22.6	23 34 24.93	−3 32 35.8	9.267$_n$	0.769	1	8, 8	Hd.	26-inch
29	9 28 7	−0 15.76	+6 29.6	23 34 24.98	−3 32 35.2	9.268$_n$	0.769	2	8, 8	Hd.	" "
30	11 16 46	+1 35.70	−7 11.8	23 33 36.19	−3 35 30.4	8.560	0.772	3	25, 5	Hd.	" "
Oct. 2	11 10 23	+3 39.96	−2 5.8	23 32 8.08	−3 40 46.4	8.625	0.773	4	20, 4	Hd.	" "
5	9 26 46	−1 35.47	+9 1.0	23 30 2.81	−3 48 1.8	9.132$_n$	0.772	5	20, 6	Fn.	" "
8	8 47 22	+1 14.32	−1 48.6	23 28 1.37	−3 54 43.5	9.264$_u$	0.772	6	30, 4	Fn.	" "
9	8 24 57	+1 55.15	−6 54.3	23 27 22.76	−3 56 45.7	9.334$_n$	0.771	7	20, 4	Fn.	" "
12	9 9 59	+0 52.10	+3 38.1	23 25 29.50	−4 2 35.0	9.026$_n$	0.775	8	30, 6	Fn.	" "
14	11 7 54	−0 20.93	+0 10.2	23 24 16.47	−4 6 2.9	9.162	0.774	9	24, 8	Fn.	" "
30	9 50 50	+2 9.44	+8 10.6	23 17 38.25	−4 17 6.4	9.116	0.776	10	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	23 34 2.64	+2.48	−3 28 29.5	+16.3	Straszburg, A. G. 8106.....	....	.. ....	Seeing fair; est. mag. 13.5.
2	23 34 38.26	+2.48	−3 39 21.1	+16.3	" " 8109.....	....	.. ....	Seeing fair.
3	23 31 58.02	+2.47	−3 28 34.9	+16.3	" " 8097.....	....	.. ....	Seeing poor; est. mag. 13.5.
4	23 28 25.65	+2.47	−3 38 56.9	+16.3	" " 8085.....	....	.. ....	Seeing good.

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(645) [1907 AG]—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
5	23 31 35.81	+2.47	−3 57 19.0	+16.2	Straszburg, A. G. 8096	....	.. ....	Est. mag. 13.7.
6	23 26 44.59	+2.46	−3 53 11.0	+16.1	" " 8078	....	.. ....	Est. mag. 13.5.
7	23 25 25.16	+2.45	−3 50 7.4	+16.0	" " 8070	....	.. ....	Est. mag. 13.5.
8	23 24 34.97	+2.43	−4 6 29.1	+16.0	" " 8066	....	.. ....	
9	23 24 34.97	+2.43	−4 6 29.1	+16.0	" " 8066	....	.. ....	
10	23 15 26.53	+2.28	−4 25 32.2	+15.2	" " 8030	....	.. ....	Good obs'n.

(653) [1907 BK].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 2	11 10 31	+0 57.40	−10 27.0	4 16 44.31	+5 44 13.1	8.660_n	0.680	1	30, 6	Hd.	26-inch
6	10 17 3	−2 21.17	−11 5.8	4 13 25.77	+5 43 33.9	9.056_n	0.682	2	20, 4	Hd.	" "
11	11 17 52	+0 15.49	+ 4 24.4	4 9 22.88	+5 45 45.1	8.738	0.680	3	18, 6	Hd.	" "
21	8 43 42	−1 4.17	+ 2 12.3	4 2 18.52	+6 0 3.3	9.200_n	0.681	4	29, 4	Hd.	" "
25	10 7 26	+0 51.09	− 8 48.1	3 59 51.51	+6 9 38.8	8.633	0.675	5	30, 6	Hd.	" "
31	10 2 20	−1 54.44	− 4 47.5	3 56 49.17	+6 27 27.5	8.934	0.673	6	25, 5	Hd.	" "
1908											
Jan. 3	9 13 23	+2 53.01	+ 1 24.3	3 55 35.94	+6 37 48.8	8.138	0.669	7	20, 4	Hd.	26-inch
6	9 51 21	−3 2.77	+ 4 4.6	3 54 33.22	+6 49 20.5	9.062	0.669	8	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C α	O–C δ	REMARKS.
	h m s	s	° ′ ″	″		s	′ ″	
1	4 15 43.73	+3.18	+5 54 34.6	+5.5	Leipzig II, A. G. 1595	....	.. ....	Seeing poor; est. mag. 12.5.
2	4 15 43.73	+3.21	+5 54 34.6	+5.1	" " " 1595	....	.. ....	Seeing good; est. mag. 12.8.
3	4 9 4.16	+3.23	+5 41 15.4	+5.3	" " " 1552	....	.. ....	Seeing poor.
4	4 3 19.44	+3.25	+5 57 46.2	+4.8	" " " 1518	....	.. ....	Moonlight; ast. very ft.
5	3 58 57.18	+3.24	+6 18 21.9	+5.0	" " " 1503	....	.. ....	Seeing very poor; ast. ft.
6	3 58 40.38	+3.23	+6 32 10.5	+4.5	" " " 1498	....	.. ....	Seeing fair; est. mag. 13.0.
7	3 52 42.94	−0.01	+6 36 30.3	−5.8	" " " 1454	....	.. ....	Seeing good; est. mag. 13.5.
8	3 57 35.99	0.00	+6 45 21.7	−5.8	" " " 1492	....	.. ....	Seeing poor.

(655) [1907 BF].

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR. $\Delta\alpha$	PLANET–STAR. $\Delta\delta$	PLANET'S APPARENT α	PLANET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 13	11 37 55	+1 35.32	+7 4.4	2 37 48.40	+4 50 36.1	8.758	0.691	1	25, 5	Hd.	26-inch
13	11 37 55	−0 39.58	−4 26.5	2 37 48.37	+4 50 35.1	8.758	0.691	2	25, 5	Hd.	" "

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(655) [1907 BF]—Continued.

DATE.	WASHINGTON MEAN TIME.	PLANET–STAR.		PLANET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 14	11 56 4	+1 48.30	+5 5.4	2 37 0.92	+4 47 54.0	9.010	0.692	3	25, 5	Fn.	26-inch
25	10 56 27	+4 22.42	+0 29.0	2 29 15.42	+4 28 48.1	8.932	0.695	4	20, 4	Hd.	" "
29	9 54 57	+2 2.26	−1 50.4	2 26 55.26	+4 26 28.4	7.079_n	0.695	5	25, 5	Hd.	" "
Dec. 2	10 22 41	+0 27.80	−1 54.5	2 25 20.80	+4 26 24.1	8.907	0.695	6	25, 5	Hd.	" "
8	10 28 56	−2 4.57	+2 22.0	2 22 48.41	+4 30 40.3	9.158	0.696	7	29, 6	Hd.	" "
11	10 34 22	+1 49.61	−1 25.0	2 21 50.92	+4 34 59.1	9.250	0.697	8	30, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	O–C		REMARKS.
						α	δ	
	h m s	s	° ′ ″	″		s	′ ″	
1	2 36 10.18	+2.90	+4 43 19.9	+11.8	Albany, A. G. 746.....	....	.. ....	
2	2 38 25.04	+2.91	+4 54 49.8	+11.8	" " 755.....	....	.. ....	
3	2 35 9.72	+2.90	+4 42 36.8	+11.8	" " 740.....	....	.. ....	
4	2 24 50.09	+2.91	+4 28 7.4	+11.7	" " 693.....	....	.. ....	Seeing fair; est. mag. 12.5.
5	2 24 50.09	+2.91	+4 28 7.4	+11.4	" " 693.....	....	.. ....	Est. mag. 12.8; star has a faint companion n. fol.
6	2 24 50.09	+2.91	+4 28 7.4	+11.2	" " 693.....	....	.. ....	Seeing poor.
7	2 24 50.09	+2.89	+4 28 7.4	+10.9	" " 693.....	....	.. ....	
8	2 19 58.45	+2.86	+4 36 13.1	+11.0	" " 672.....	....	.. ....	Seeing poor; moonlight; ast. very ft.

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OBSERVATIONS OF COMETS.

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COMET 1893 IV.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1893	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 11	7 25 14	+0 11.15	+ 5 42.8	15 4 7.75	+64 32 34.8	9.772	0.876	1	20, 4	F.	9.6-inch
13	10 2 37	+5 1.28	+16 0.3	15 22 21.01	+66 43 37.0	8.794_n	0.928	2	18, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS
	h m s	s	° ′ ″	″		
1	15 3 57.49	−0.89	+64 27 19.7	−27.7	Hels.-Gotha, A. G. 8234	
2	15 17 21.10	−1.37	+66 28 4.1	−27.4	Christiania, A. G. 2291	

COMET 1894 II.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG pA.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1894	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 29	8 20 9	+3 1.36	− 6 31.2	7 30 29.02	−22 48 11.5	9.582	0.830	1	15, 3	Hill	9.6-inch
30	8 11 17	−1 33.26	− 0 58.7	7 43 30.11	−18 45 28.7	9.540	0.829	2	20, 4	Hill	" "
May 1	8 11 54	−1 7.00	− 1 49.0	7 56 4.60	−14 37 14.6	9.515	0.817	3	20, 4	F.	" "
3	8 10 6	+1 2.52	+ 4 25.0	8 19 25.53	− 6 26 27.5	9.467	0.782	4	20, 4	F.	" "
4	9 3 21	+1 20.07	− 0 44.2	8 30 37.70	− 2 24 14.6	9.552	0.754	5	15, 3	Hill	" "
4	9 29 2	+0 37.10	+ 1 34.1	8 30 48.59	− 2 18 46.1	9.586	0.751	6	20, 4	F.	" "
7	9 20 51	−3 38.93	+10 28.4	8 59 44.89	+ 8 6 59.8	9.556	0.684	7	20, 4	F.	" "
9	8 25 18	+0 35.79	+11 36.4	9 16 8.17	+13 45 28.6	9.433	0.603	8	20, 4	F.	" "
12	10 0 39	+0 53.24	+ 6 9.9	9 38 20.87	+20 46 51.1	9.610	0.579	9	20, 4	Hill	" "
12	10 2 26	+0 53.64	+ 6 16.4	9 38 21.27	+20 46 57.6	9.612	0.581	10	19, 4	F.	" "
13	9 3 54	+1 40.51	+ 3 4.5	9 44 33.43	+22 35 18.3	9.517	0.493	11	20, 4	Hill	" "
20	10 16 0	−4 48.26	− 6 12.6	10 21 44.94	+31 52 0.2	9.656	0.434	12	5, 1	Hill	" "
27	10 30 18	−0 20.52	+ 7 16.0	10 48 38.10	+36 50 31.0	9.699	0.382	13	23, 5	F.	" "
28	10 11 1	+3 2.71	+ 1 1.2	10 51 52.65	+37 20 34.5	9.680	0.316	14	20, 4	F.	" "
June 2	9 19 40	−3 10.34	− 1 2.0	11 6 47.55	+39 22 19.0	9.619	0.065	15	20, 4	F.	" "
15	10 24 47	+0 22.61	− 3 53.3	11 38 24.83	+42 14 50.9	9.751	0.341	16	20, 4	F.	" "
22	10 8 20	−0 52.13	− 5 18.6	11 52 50.54	+42 58 10.9	9.753	0.314	17	20, 4	F.	" "
23	10 25 49	+1 7.43	− 1 1.6	11 54 50.08	+43 2 27.9	9.769	0.384	18	17, 4	F.	" "
28	10 47 4	+2 43.99	+ 4 35.2	12 4 28.26	+43 19 39.7	9.788	0.479	19	15, 3	F.	" "
July 7	10 42 11	+1 13.70	+ 6 8.4	12 21 0.73	+43 32 40.9	9.795	0.516	20	5, 1	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	7 27 27.59	+0.07	−22 41 34.1	−6.2	Algiers, A. G. Zones	
2	7 45 3.18	+0.19	−18 44 24.1	−5.9	U. S. Naval Observatory transit circle position	
3	7 57 11.31	+0.29	−14 35 20.4	−5.2	Washington, A. G. 3099	
4	8 18 22.54	+0.47	− 6 30 49.0	−3.5	Wien-Ottakring, A. G. 3216	
5	8 29 17.07	+0.56	− 2 23 27.8	−2.6	Straszburg, A. G. 3301	
6	8 30 10.92	+0.57	− 2 20 17.6	−2.6	" " 3310	
7	9 3 22.97	+0.85	+ 7 56 31.9	−0.5	Leipzig, II, A. G. 4977	
8	9 15 31.40	+0.98	+13 33 51.2	+1.0	Leipzig, I, A. G. 3719	

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COMET 1894 II—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
9	9 37 26.45	+1.18	+20 40 38.5	+2.7	Berlin B, A. G. 3830	
10	9 37 26.45	+1.18	+20 40 38.5	+2.7	" " " 3830	
11	9 42 51.70	+1.22	+22 32 10.6	+3.2	" " " 3846	
12	10 26 31.66	+1.54	+31 58 8.1	+4.7	Leiden, A. G. 4211	
13	10 48 56.93	+1.69	+36 43 9.4	+5.6	Lund, A. G. 5064	
14	10 48 48.26	+1.68	+37 19 27.5	+5.8	" " 5063	
15	11 9 56.12	+1.77	+39 23 15.3	+5.7	" " 5155	
16	11 38 0.42	+1.80	+42 18 38.4	+5.8	Bonn, A. G. 8173	
17	11 53 40.85	+1.82	+43 3 24.1	+5.4	Bonn VI, +43° 2172	
18	11 53 40.85	+1.80	+43 3 24.1	+5.4	" " " "	
19	12 1 42.53	+1.74	+43 14 59.1	+5.4	Bonn, A. G. 8347	
20	12 19 45.31	+1.72	+43 26 27.9	+4.6	" " 8491	

COMET ENCKE.

[1895 I, 1905 I.]

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1894	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 19	7 0 18	+4 42.24	− 1 12.9	22 16 53.87	+ 4 35 56.5	9.464	0.704	1	20, 4	F.	9.6-inch
20	6 39 17	−2 23.28	− 2 46.0	22 16 39.14	+ 4 28 57.0	9.422	0.703	2	5, 4	F.	" "
20	6 50 39	+0 31.72	− 1 34.3	22 16 38.81	+ 4 28 47.8	9.422	0.703	3	16, 3	F.	" "
22	7 39 45	−3 58.62	+ 1 21.1	22 16 11.13	+ 4 14 10.3	9.560	0.714	4	27, 6	F.	" "
23	6 31 34	−4 13.71	− 5 12.7	22 15 56.03	+ 4 7 36.4	9.434	0.706	5	20, 4	Hill	" "
1895											
Jan. 14	7 16 30	+0 3.64	+10 31.6	22 3 20.62	− 0 0 5.9	9.639	0.740	6	25, 5	F.	9.6-inch
17	7 25 46	+0 30.34	+ 7 28.0	21 57 38.33	− 1 18 9.5	9.652	0.742	7	5, 1	F.	" "
17	7 25 46	−1 43.98	+ 6 44.7	21 57 38.67	− 1 18 13.3	9.652	0.742	8	5, 1	F.	" "
19	7 22 51	−0 16.41	− 4 26.2	21 52 36.90	− 2 24 18.0	9.656	0.743	9	16, 4	F.	" "
1904											
Nov. 11	8 44 8	+0 14.47	.. ....	22 30 47.03	.. ..	9.299	.....	10	19, .	R.	26-inch
11	8 52 16	.. ..	+ 2 44.9	.. ..	+20 15 10.0	.....	0.481	11	.., 6	R.	" "
11	9 13 56	+0 10.29	.. ....	22 30 42.85	.. ..	9.407	.....	12	7, .	R.	" "
27	7 15 7	−0 36.71	− 2 19.9	21 26 16.49	+11 36 23.3	9.413	0.627	13	27, 9	R.	" "
28	7 36 41	+1 41.92	+ 5 16.7	21 22 31.78	+11 1 37.8	9.485	0.644	14	18, 6	R.	" "
30	6 30 5	+1 44.58	+ 3 12.1	21 15 22.12	+ 9 54 14.6	9.339	0.641	15	24, 8	R.	" "
Dec. 8	6 56 35	+0 27.00	− 6 3.6	20 45 41.35	+ 5 5 32.3	9.546	0.706	16	21, 7	R.	" "
13	7 36 51	−1 57.58	− 2 57.8	20 25 32.65	+ 1 45 48.6	9.633	0.734	17	25, 5	R.	12-inch
14	6 55 15	+1 33.58	+ 0 44.1	20 21 24.05	+ 1 4 32.2	9.605	0.735	18	25, 5	R.	" "
16	7 8 22	−0 37.52	+ 0 3.2	20 12 29.49	− 0 23 58.8	9.631	0.742	19	24, 8	R.	" "
20	6 5 16	.. ..	− 4 8.8	.. ..	− 3 33 28.8	.....	0.755	20	.., 8	R.	" "
20	6 15 42	−0 22.77	.. ....	19 53 24.12	.. ..	9.617	.....	21	8, .	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	22 12 9.27	+2.36	+4 36 53.9	+15.5	Albany, A. G. 7744	
2	22 19 0.03	+2.39	+4 31 27.1	+15.9	" " 7761	
3	22 16 4.71	+2.38	+4 30 6.3	+15.8	" " 7754	
4	22 20 7.37	+2.38	+4 12 33.5	+15.7	" " 7767	
5	22 20 7.37	+2.37	+4 12 33.5	+15.6	" " 7767	

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COMET ENCKE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
6	22 3 17.76	−0.78	− 0 10 31.4	− 6.1	Nicolajew, A. G. 5581	
7	21 57 8.79	−0.80	− 1 25 30.6	− 6.9	" " 5557	
8	21 59 23.45	−0.80	− 1 24 51.2	− 6.8	" " 5561	
9	21 52 54.12	−0.81	− 2 19 44.5	− 7.3	Straszburg, A. G. 7675	
10	22 30 29.82	+2.74	+20 11 56.2	+28.9	Berlin A, A. G. 9236	Seeing poor; comet extremely faint; no nucleus.
11	22 30 29.82	+2.74	+20 11 56.2	+28.9	" " " 9236	
12	22 30 29.82	+2.74	+20 11 56.2	+28.9	" " " 9236	
13	21 26 51.17	+2.03	+11 38 17.7	+25.5	Leipzig I, A. G. 8535	Seeing good; comet diffuse; slight condensation away from the Sun.
14	21 20 47.88	+1.98	+10 55 56.0	+25.1	" " " 8489	Seeing good.
15	21 13 35.63	+1.91	+ 9 50 38.1	+24.4	Leipzig II, A. G. 10665	Seeing rather poor.
16	20 45 12.66	+1.69	+ 5 11 14.4	+21.5	½ (Leipzig II, A. G. 10391+Albany, A. G. 7289)	Seeing good; comet quite bright, with decided condensation away from Sun.
17	20 27 28.63	+1.60	+ 1 48 27.1	+19.3	Albany, A. G. 7158	Seeing fair; moonlight; comet faint, being near horizon.
18	20 19 48.90	+1.57	+ 1 3 29.4	+18.7	½ (Albany, A. G. 7104+Nicolajew, A. G. 5161)	Seeing good; comet fairly bright.
19	20 13 5.46	+1.55	− 0 24 19.9	+17.9	Nicolajew, A. G. 5122	Seeing fair; bright moonlight; comet quite faint, being near horizon.
20	19 53 45.38	+1.51	− 3 29 36.1	+16.1	Straszburg, A. G. 6880	Seeing fair.
21	19 53 45.38	+1.51	− 3 29 36.1	+16.1	" " 6880	Seeing fair.

COMET 1895 II.

DATE.	WASHINGTON MEAN TIME.	COMET−STAR		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 27	13 18 19	−1 3.00	−7 28.6	0 43 45.92	+6 2 10.4	9.079_n	0.679	1	24, 6	Hill	26-inch
Sept. 11	11 38 30	+1 43.52	−3 16.7	1 8 58.72	+5 59 24.8	9.383_n	0.687	2	16, 4	Hill	" "
14	11 57 2	−1 31.39	+1 13.4	1 12 31.58	+5 50 42.4	9.288_n	0.684	3	14, 5	Hill	" "
20	12 33 52	−0 57.82	−4 12.4	1 18 2.34	+5 31 17.3	8.950_n	0.684	4	16, 4	Hill	" "
21	12 10 4	−0 42.59	−1 44.9	1 18 48.81	+5 22 45.2	9.112_n	0.686	5	22, 5	Hill	" "
23	11 49 18	+0 32.10	+2 33.7	1 20 9.48	+5 13 34.2	9.195_n	0.689	6	20, 5	Hill	" "
27	12 34 10	+0 11.80	−2 55.4	1 22 20.87	+4 54 49.1	8.627_n	0.690	7	19, 4	F.	" "
Oct. 18	10 49 36	−0 31.55	+1 58.6	1 26 47.30	+3 35 17.8	8.976_n	0.705	8	20, 4	F.	" "
21	8 52 48	−0 14.45	−3 16.0	1 27 4.43	+3 30 3.1	9.453_n	0.713	9	18, 4	F.	" "
25	11 22 40	+0 13.60	−7 21.6	1 27 32.52	+3 25 57.7	8.391	0.706	10	23, 8	F.	" "
26	13 11 35	+2 37.72	−0 24.2	1 27 41.02	+3 25 47.3	9.377	0.711	11	11, 2	F.	" "
Nov. 18	8 33 27	+0 18.06	−7 37.4	1 35 2.15	+4 16 15.7	9.141_n	0.699	12	22, 2	F.	" "
Dec. 16	9 20 17	−0 17.21	−2 27.8	1 56 53.45	+7 8 14.3	9.112	0.666	13	6, 5	Br. Hill	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	0 44 45.60	+3.32	+6 9 16.1	+22.9	U. S. Naval Observatory transit circle position.	
2	1 7 11.65	+3.55	+6 2 16.4	+25.1	" " " " "	
3	1 13 59.37	+3.60	+5 49 3.4	+25.6	" " " " "	

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COMET 1895 II—Continued

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
4	1 18 56.49	+3.67	+5 35 3.6	+26.1	U.S. Naval Observatory transit circle position..	Comet has a faint stellar nucleus of about mag. 13. Seeing poor; comet faint.
5	1 19 27.72	+3.68	+5 24 3.9	+26.2	" " " " " "	
6	1 19 33.66	+3.72	+5 10 34.2	+26.3	" " " " " "	
7	1 22 5.28	+3.79	+4 57 17.8	+26.7	Albany, A. G. 402	
8	1 27 14.87	+3.98	+3 32 51.9	+27.3	" " 424	
9	1 27 14.87	+4.01	+3 32 51.9	+27.2	" " 424	
10	1 27 14.87	+4.05	+3 32 51.9	+27.4	" " 424	
11	1 24 59.25	+4.05	+3 25 44.2	+27.3	" " 409	
12	1 34 39.99	+4.10	+4 23 26.5	+26.6	" " 467	
13	1 57 6.53	+4.13	+7 10 16.5	+25.6	Leipzig II, A. G. 777	

COMET 1895 IV.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1895	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 18	17 49 33	−2 48.87	+0 58.7	13 48 40.71	+ 0 42 32.9	9.604_n	0.737	1	8, 2	F.	9.6-inch
22	18 0 23	−4 3.27	+3 15.1	13 58 31.61	− 1 35 19.8	9.586_n	0.748	2	5, 1	F.	" "
27	17 47 17	−1 23.12	+6 0.8	14 14 25.58	− 5 15 17.0	9.598_n	0.763	3	20, 4	F.	" "
28	18 2 18	+3 58.23	+7 13.1	14 18 22.37	− 6 8 48.1	9.581_n	0.769	4	15, 2	F.	" "
Dec. 3	18 11 27	−1 12.24	−0 25.2	14 43 44.09	−11 35 40.7	9.582_n	0.791	5	21, 5	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	13 51 27.70	+1.88	+ 0 41 51.1	−16.9	Albany, A. G. 4829	
2	14 2 32.94	+1.94	− 1 38 17.7	−17.2	Nicolajew, A. G. 3691	
3	14 15 46.70	+2.00	− 5 21 0.8	−17.0	Straszburg, A. G. 5097	
4	14 14 22.11	+2.03	− 6 15 44.2	−17.0	½ (Straszburg, A. G. 5092+Wien-Ottakring, A. G. 5069).	
5	14 44 54.21	+2.12	−11 34 59.3	−16.2	Camb., U. S., A. G. Zones	

COMET 1896 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Feb. 27	7 10 52	+0 20.62	+4 33.8	23 2 7.98	+46 26 16.7	9.816	0.664	1	19, 4	F.	12-inch
Mar. 3	6 51 25	−0 39.37	−5 6.9	1 8 18.67	+51 45 48.8	9.836	0.142	2	20, 4	F.	" "
5	7 8 47	+0 50.57	+7 18.6	1 45 7.09	+51 32 49.8	9.824	0.066	3	20, 4	F.	" "
7	7 57 44	−0 10.36	+0 50.5	2 14 21.49	+50 49 53.7	9.838	0.264	4	18, 4	F.	" "
9	7 23 15	+0 6.32	+0 12.5	2 36 35.58	+49 57 1.0	9.788	9.955	5	19, 4	F.	" "

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COMET 1896 I—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 12	7 14 6	−3 40.92	− 3 57.6	3 2 7.57	+48 33 25.2	9.748	9.798	6	20, 4	F.	12-inch
14	7 28 52	+0 32.12	+ 6 18.6	3 15 19.38	+47 40 11.5	9.753	9.957	7	20, 4	F.	" "
17	7 20 31	+2 13.00	+13 14.7	3 31 1.56	+46 27 43.2	9.727	9.918	8	9, 2	F.	" "
20	8 2 18	−0 1.04	+ 6 45.9	3 43 27.45	+45 24 18.9	9.766	0.231	9	17, 4	F.	" "
21	7 42 46	+2 37.52	− 3 17.2	3 46 58.46	+45 5 16.8	9.744	0.140	10	15, 3	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	23 1 48.86	−1.50	+46 21 41.9	+ 1.0	Bonn, A. G. 17441	
2	1 8 59.21	−1.17	+51 50 43.0	+12.7	Camb., U. S., A. G. 566	
3	1 44 17.37	−0.85	+51 25 16.4	+14.8	" " " 846	
4	2 14 32.40	−0.55	+50 48 47.0	+16.2	" " " 1096	
5	2 36 29.58	−0.32	+49 56 31.6	+16.9	Bonn, A. G. 2312	
6	3 5 48.54	−0.05	+48 37 5.4	+17.4	" " 2683	
7	3 14 47.24	+0.02	+47 33 35.7	+17.2	" " 2799	
8	3 28 48.45	+0.11	+46 14 11.7	+16.8	" " 3025	
9	3 43 28.27	+0.22	+45 17 16.5	+16.5	" " 3203	
10	3 44 20.72	+0.22	+45 8 17.6	+16.4	" " 3213	

COMET FAYE.

[1896 II.]

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1895	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 18	9 28 36	−0 22.53	−5 1.3	21 11 44.95	−4 27 37.8	9.380	0.774	1	13, 3	F.	26-inch
Nov. 18	7 28 42	−2 37.80	−3 55.5	21 40 57.13	−5 57 7.1	9.284	0.786	2	10, 2	F.	" "
19	7 22 55	−1 17.90	−3 55.0	21 42 17.02	−5 57 6.7	9.271	0.787	3	12, 3	A.	" "
21	7 5 27	−0 2.22	−1 54.6	21 45 2.37	−5 56 44.2	9.214	0.788	4	4, 3	Br.	" "
Dec. 16	7 7 53	−0 21.19	−6 26.4	22 26 6.69	−4 52 26.2	9.429	0.775	5	17, 4	Br. / Hill	" "
1896											
Jan. 11	7 14 22	+0 11.68	−5 22.2	23 18 51.88	−2 1 5.4	9.544	0.752	6	8, 4	Br.	26-inch
14	7 25 8	+0 4.45	+0 21.6	23 25 28.20	−1 35 31.1	9.568	0.749	7	8, 4	Br.	" "
15	6 47 26	+0 11.20	−2 1.8	23 27 37.98	−1 27 4.6	9.509	0.750	8	8, 5	Br.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	21 12 4.22	+3.26	−4 22 49.6	+13.1	Straszburg, A. G. 7428	
2	21 43 31.86	+3.07	−5 53 25.7	+14.1	½ (Straszburg, A. G. 7625+Wien-Ottakring, A. G. 7839).	
3	21 43 31.86	+3.06	−5 53 25.7	+14.0	½ (Straszburg, A. G. 7625+Wien-Ottakring, A. G. 7839).	Sky thick; comet faint.

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COMET FAYE—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
4	21 45 1.55	+3.04	−5 55 3.6	+14.0	Micrometer comparison with— Straszburg, A. G. 7625 $\Delta\alpha = +1^m\ 29^s.69$. Wien-Ottakring, A. G. 7839 $\Delta\delta = -1'\ 37''.9$.	Bright moonlight; comet extremely faint.
5	22 26 24.90	+2.98	−4 46 15.8	+16.0	Straszburg, A. G. 7821	
6	23 18 40.29	−0.09	−1 55 41.9	− 1.3	Micrometer comparison with— Nicolajew, A. G. 5817 $\Delta\alpha = +0^m\ 14^s.77$ $\Delta\delta = -2'\ 19''.1$	Clouds.
7	23 25 23.82	−0.07	−1 35 51.6	− 1.1	Micrometer comparison with— Radcliffe 1890, 6273 $\Delta\alpha = +1\ 13^s.57$ $\Delta\delta = +0\ 35''.4$	
8	23 27 26.84	−0.06	−1 25 1.8	− 1.0	Nicolajew, A. G. 5842	

COMET 1896 III.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 26	8 10 40	−3 2.79	− 8 37.0	3 18 10.39	+43 52 25.5	9.779	0.739	1	20,4	Hill	12-inch
29	8 11 56	+3 25.02	+ 5 17.3	3 5 21.61	+50 16 19.6	9.811	0.760	2	15,3	F.	" "
May 4	8 13 54	−2 31.43	+ 2 9.1	2 38 2.79	+58 26 3.0	9.841	0.808	3	20,4	F.	" "
4	8 18 3	+2 39.62	− 0 25.6	2 38 2.27	+58 26 23.4	9.835	0.813	4	15,3	F.	" "
6	9 3 34	+0 17.50	+ 2 50.8	2 25 13.57	+60 57 58.8	9.732	0.880	5	20,4	F.	" "
9	9 58 42	−1 1.87	−19 33.5	2 4 47.69	+64 2 31.1	9.374	0.925	6	6,2	F.	" "
14	11 19 20	+4 1.71	−11 37.1	1 28 51.64	+67 40 50.7	9.635	0.904	7	19,4	F.	" "
15	11 18 58	+2 49.44	+ 6 2.9	1 21 37.72	+68 13 40.5	9.695	0.896	8	20,4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	3 21 13.40	−0.22	+44 0 52.5	+10.0	Bonn, A. G. 2906	There is probably a mistake of one wire interval in δ; δ should be either +43° 57′ 0″.7 or +43° 56′ 59″.5.
2	3 1 57.07	−0.48	+50 10 53.2	+ 9.1	Camb., U. S., A. G. 1391	
3	2 40 35.15	−0.93	+58 23 46.4	+ 7.5	Hels.-Gotha, A. G. 2515	
4	2 35 23.61	−0.96	+58 26 41.8	+ 7.2	" " " 2447	
5	2 24 57.23	−1.16	+60 55 1.9	+ 6.1	" " " 2303	
6	2 5 51.08	−1.52	+64 22 0.5	+ 4.1	" " " 1959	
7	1 24 51.74	−1.81	+67 52 27.7	+ 0.1	Christiania, A. G. 285	
8	1 18 50.07	−1.79	+68 7 38.3	− 0.7	" " 261	

COMET 1896 V.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1896	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 8	8 18 24	−3 50.08	−3 42.8	17 18 36.56	− 8 10 49.7	9.407	0.796	1	12,3	Br.	26-inch

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COMET 1896 V—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 10	8 9 0	−0 1.29	+4 17.7	17 22 36.34	− 8 30 1.6	9.391	0.799	2	6, 7	Br.	26-inch
11	7 56 36	−0 20.83	+1 50.9	17 24 38.64	− 8 39 32.7	9.358	0.802	3	8, 5	Br.	" "
Nov. 25	7 9 42	−0 4.10	−0 50.2	21 6 18.02	−12 37 38.7	9.443	0.818	4	3, 3	Br.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	17 22 23.61	+3.03	− 8 7 1.3	− 5.6	Wien-Ottakring, A. G. 5918.....	
2	17 22 34.63	+3.00	− 8 34 13.7	− 5.6	Micrometer comparison with— Wien-Ottakring, A. G. 5910. $\Delta\alpha = +2^m\ 24^s.19$..... $\Delta\delta = +0'\ 30''.6$	Comet very faint.
3	17 24 56.47	+3.00	− 8 41 18.1	− 5.5	Micrometer comparison with— Wien-Ottakring, A. G. 5927. $\Delta\alpha = +0^m\ 15^s.44$..... .. $\Delta\delta = +6'\ 9''.7$.....	
4	21 6 18.88	+3.24	−12 36 59.4	+10.9	Micrometer comparison with— Schjellerup 8524... $\Delta\alpha = +1^m\ 38^s.39$..... $\Delta\delta = +5'\ 20''.1$.....	Comet almost invisible.

COMET BROOKS.

[1896 VI, 1903 V.]

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
July 17	13 55 45	+0 13.46	−2 20.4	22 38 55.46	−18 14 44.2	9.072_n	0.863	1	6, 5	Br.	26-inch
Aug. 3	13 2 30	−0 23.20	−2 4.0	22 37 7.88	−18 37 28.1	8.938_n	0.867	2	8, 5	Br.	" "
4	14 12 15	−0 23.54	−2 21.4	22 36 45.89	−18 39 15.9	8.838	0.868	3	8, 5	Br.	" "
11	12 48 18	−0 5.89	−0 53.0	22 33 39.22	−18 51 37.4	8.637	0.870	4	7, 8	Br.	" "
14	12 16 12	+2 23.88	+0 24.1	22 32 0.48	−18 56 29.1	8.916_n	0.869	5	24, 5	Br.	" "
28	11 19 30	−0 8.33	−1 34.4	22 22 48.98	−19 9 0.4	8.826_n	0.870	6	9, 7	Br.	" "
Sept. 1	10 33 22	−0 38.76	−2 36.6	22 20 4.00	−19 7 49.4	9.094_n	0.867	7	20, 5	Br.	" "
4	9 55 22	−2 38.74	+0 2.7	22 18 4.04	−19 5 10.2	9.241_n	0.862	8	27, 5	Br.	" "
8	10 7 48	−0 16.83	+2 30.4	22 15 31.36	−18 58 57.5	9.045_n	0.867	9	6, 5	Br.	" "
Oct. 5	9 37 42	−2 59.12	−1 2.8	22 8 17.14	−16 54 55.0	8.802	0.860	10	12, 6	Br.	" "
7	8 25 0	+0 3.22	+0 58.2	22 8 37.64	−16 40 45.4	8.860_n	0.858	11	6, 5	Br.	" "
9	8 50 12	+0 2.11	−6 20.8	22 9 6.59	−16 25 29.8	7.664_n	0.858	12	8, 5	Br.	" "
Nov. 6	7 23 18	−0 39.28	−3 5.3	22 28 31.35	−11 57 45.7	7.522	0.832	13	18, 5	Br.	" "
25	8 54 30	−0 16.94	+3 54.2	22 52 28.60	− 8 9 12.2	9.434	0.794	14	6, 4	Br.	" "
Dec. 9	9 27 0	+0 9.57	+0 57.8	23 13 44.48	− 5 5 8.8	9.562	0.767	15	4, 4	Br.	" "
23	6 31 54	+1 39.31	. ....	23 36 53.27	.. ..	9.120	.....	16	8, .	Br.	" "
23	7 3 30	.. ..	−0 9.4	.. ..	− 1 53 41.6	.....	0.756	17	., 3	Br.	" "
23	7 21 0	0 0.00	+0 2.9	23 36 56.64	− 1 53 29.3	9.346	0.755	18	1, 1	Br.	" "
24	6 51 30	+0 4.49	−1 52.0	23 38 38.45	− 1 39 48.2	9.238	0.754	19	5, 4	Br.	" "
24	7 15 6	+2 0.77	. ....	23 38 39.64	.. ..	9.334	.....	20	6, .	Br.	" "
30	6 55 42	+0 16.58	−5 43.9	23 49 10.98	− 0 15 22.6	9.310	0.742	21	5, 5	Br.	" "
1897											
Jan. 6	6 43 12	+0 9.80	+6 32.3	0 1 45.55	+ 1 23 49.7	9.320	0.728	22	6, 8	Br.	26-inch
23	7 26 18	+0 12.03	−2 39.8	0 33 27.36	+ 5 24 53.6	9.525	0.698	23	8, 6	Br.	" "
Feb. 4	7 30 0	−0 10.02	−2 45.5	0 56 31.01	+ 8 11 30.8	9.571	0.682	24	5, 4	Br.	" "

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COMET BROOKS—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Aug. 20	11 37 39	−1 22.65	− 4 55.4	21 1 27.32	−27 4 26.5	8.820	0.903	25	27, 6	Fk.	26-inch
21	11 20 21	+1 55.95	+ 2 38.7	21 0 43.52	−27 4 12.9	8.577	0.903	26	23, 5	Fk.	" "
Sept. 13	10 21 33	+1 22.49	− 8 25.4	20 50 5.86	−26 4 37.9	9.114	0.895	27	23, 5	Fk.	" "
14	10 1 40	+1 16.68	− 3 42.1	20 50 0.05	−25 59 54.6	8.980	0.897	28	30, 6	Fk.	" "
15	9 47 29	+1 12.70	+ 1 18.5	20 49 56.06	−25 54 54.1	8.864	0.898	29	28, 6	Fk.	" "
25	9 42 36	−1 5.15	− 0 16.0	20 51 11.13	−24 56 15.7	9.158	0.890	30	30, 6	Fk.	" "
Oct. 12	8 23 58	−1 15.51	− 2 19.9	21 1 8.18	−22 45 31.0	8.982	0.885	31	30, 6	Fk.	" "
13	8 0 6	−0 24.18	+ 6 17.6	21 1 59.49	−22 36 53.6	8.710	0.886	32	9, 8	Fk.	" "
19	7 38 55	+0 11.65	− 1 16.8	21 7 45.96	−21 42 1.2	8.640	0.883	33	8, 8	Fk.	" "
Nov. 8	6 52 51	−1 58.72	−10 4.4	21 33 15.18	−18 12 7.4	8.743	0.866	34	39, 8	Fk.	" "
9	6 32 16	−0 30.86	+ 1 15.4	21 34 43.03	−18 0 47.6	8.294	0.866	35	8, 8	Fk.	" "
9	7 14 46	−1 6.55	− 1 21.3	21 34 45.63	−18 0 24.9	9.024	0.863	36	39, 8	Fk.	" "
18	7 16 43	+1 26.61	+ 2 50.1	21 48 49.41	−16 12 31.1	9.186	0.851	37	24, 6	Fk.	" "
19	6 43 12	+0 4.66	− 2 29.6	21 50 25.29	−16 0 19.3	8.949	0.854	38	10, 10	Fk.	" "
19	7 14 12	−1 7.02	+ 4 15.5	21 50 27.37	−16 0 1.8	9.185	0.850	39	33, 7	Fk.	" "
20	6 44 29	+2 18.10	− 5 10.7	21 52 4.04	−15 47 48.4	8.992	0.852	40	34, 6	Fk.	" "
Dec. 6	6 24 31	−0 28.30	+ 7 21.4	22 19 56.02	−12 16 21.9	9.103	0.831	41	10, 10	Fk.	" "
7	6 36 15	−2 49.14	− 1 36.0	22 21 46.38	−12 2 26.5	9.186	0.828	42	30, 6	Fk.	" "
11	6 42 45	+0 32.48	− 5 17.8	22 29 8.79	−11 6 12.5	9.258	0.820	43	10, 10	Fk.	" "
13	6 12 48	−1 3.23	− 1 56.0	22 32 50.32	−10 38 5.2	9.120	0.821	44	29, 6	Fk.	" "
15	6 33 21	+2 12.41	− 4 1.4	22 36 36.96	−10 9 11.7	9.252	0.815	45	30, 6	Fk.	" "
17	6 27 46	+2 26.51	− 0 54.7	22 40 23.57	− 9 40 16.8	9.245	0.812	46	29, 6	Fk.	" "
22	6 27 27	+0 8.74	+ 4 20.1	22 49 56.59	− 8 26 56.0	9.286	0.803	47	12, 12	Fk.	" "
1904											
Jan. 5	6 45 5	−0 25.60	− 3 2.7	23 17 21.81	− 4 55 32.2	9.432	0.775	48	12, 12	Fk.	26-inch
14	6 51 44	+0 2.53	+ 2 57.1	23 35 21.39	− 2 36 30.7	9.486	0.758	49	10, 12	Fk.	" "
15	6 43 9	+2 2.55	− 4 2.0	23 37 22.04	− 2 21 16.7	9.472	0.756	50	10, 3	Fk.	" "
18	6 59 22	+3 5.17	− 3 47.7	23 43 26.20	− 1 34 22.6	9.517	0.750	51	32, 6	Fk.	" "
19	6 47 19	+2 9.94	− 0 25.8	23 45 26.53	− 1 18 56.0	9.497	0.749	52	26, 6	Fk.	" "
19	7 18 6	−2 17.97	+ 1 57.4	23 45 29.11	− 1 18 37.4	9.551	0.748	53	30, 6	Fk.	" "
Feb. 3	7 5 50	+0 51.51	+ 4 8.6	0 16 5.02	+ 2 34 7.8	9.575	0.726	54	25, 6	Fk.	" "
4	7 1 30	−1 29.25	− 0 54.4	0 18 8.24	+ 2 49 36.0	9.572	0.724	55	30, 8	Fk.	" "
6	7 15 2	+0 56.34	+ 2 53.3	0 22 16.45	+ 3 20 28.1	9.593	0.723	56	22, 6	Fk.	" "
8	7 23 58	+1 44.55	+ 0 21.5	0 26 24.75	+ 3 51 17.9	9.607	0.722	57	24, 6	Fk.	" "
11	7 14 18	−0 29.88	+ 1 8.4	0 32 35.56	+ 4 37 4.7	9.604	0.717	58	38, 5	Fk.	" "
15	7 30 16	−0 13.85	+ 4 1.8	0 40 54.17	+ 5 37 47.9	9.626	0.717	59	4, 4	Fk.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	22 38 38.44	+3.56	−18 12 43.2	+19.4	Micrometer comparison with— B. D. −18° 6178 $\Delta\alpha = +0^m\ 25^s.18$ $\Delta\delta = -4'\ 1''.0$	Washington and Mt. Hamilton.
2	22 37 27.12	+3.96	−18 35 44.9	+20.8	Washington and Mt. Hamilton observation of B. D. −18° 6175.	
3	22 37 5.45	+3.98	−18 37 15.3	+20.8	Micrometer comparison with— B. D. −18° 6175 $\Delta\alpha = -0^m\ 21^s.67$ $\Delta\delta = -1'\ 30''.4$	Washington and Mt. Hamilton.
4	22 33 40.97	+4.14	−18 51 5.2	+20.8	Micrometer comparison with— Radcliffe 1890, 6058 $\Delta\alpha = +2^m\ 40^s.91$ $\Delta\delta = -2'\ 31''.1$	
5	22 29 32.41	+4.19	−18 57 13.7	+20.5	Algiers, A. G. Zones	
6	22 22 52.96	+4.35	−19 7 45.9	+19.9	Micrometer comparison with— B. D. −19° 6275 $\Delta\alpha = +2^m\ 14^s.59$ $\Delta\delta = -2'\ 13''.4$	Washington and Mt. Hamilton.
7	22 20 38.37	+4.39	−19 5 32.5	+19.7	Washington and Mt. Hamilton observations of B. D. −19° 6275.	
8	22 20 38.37	+4.41	−19 5 32.5	+19.6	Washington and Mt. Hamilton observations of B. D. −19° 6275.	
9	22 15 43.80	+4.41	−19 1 47.1	+18.9	Radcliffe 1890, 6001	
10	22 11 12.02	+4.24	−16 54 9.6	+17.4	Washington, A. G. 8323	
11	22 8 30.22	+4.20	−16 42 0.7	+17.1	" " 8309	

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COMET BROOKS—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
12	22 9 0.30	+4.18	−16 19 26.2	+17.2	Washington, A. G. 8313	
13	22 29 6.79	+3.84	−11 54 58.7	+18.3	U. S. Naval Observatory transit circle position	
14	22 52 41.85	+3.69	− 8 13 26.3	+19.9	Micrometer comparison with— Wien-Ottakring, A. G. 8171 $\Delta\alpha = -0^m\ 22^s.87$, $\Delta\delta = +3'\ 57''.8$	
15	23 13 31.30	+3.61	− 5 6 27.9	+21.3	Micrometer comparison with— Straszburg, A. G. 8018 $\Delta\alpha = +0^m\ 59^s.50$, $\Delta\delta = -1'\ 4''.1$	
16	23 35 10.42	+3.54	− 1 56 16.5	+22.5	Straszburg, A. G. 8116	
17	23 36 53.09	+3.55	− 1 53 54.7	+22.5	" " 8116	
18	23 36 53.09	+3.55	− 1 53 54.7	+22.5	Micrometer comparison with— Straszburg, A. G. 8116 $\Delta\alpha = +1^m\ 42^s.67$, $\Delta\delta = +2'\ 21''.7$	
19	23 38 30.42	+3.54	− 1 38 18.8	+22.6	Micrometer comparison with— Nicolajew, A. G. 5875 $\Delta\alpha = +1^m\ 55^s.08$, $\Delta\delta = +2'\ 8''.4$	
20	23 36 35.34	+3.53	− 1 40 27.2	+22.6	Nicolajew, A. G. 5875	
21	23 48 50.88	+3.52	− 0 10 1.6	+22.9	" " 5907	
22	0 1 35.29	+0.46	+ 1 17 13.9	+ 3.5	½ (Nicolajew, A. G. 1+Albany, A. G. 3)	
23	0 33 14.91	+0.42	+ 5 27 28.9	+ 4.5	Leipzig II, A. G. 201	
24	0 56 40.61	+0.42	+ 8 14 11.0	+ 5.3	" " 367	
25	21 2 46.24	+3.73	−26 59 52.3	+21.2	Cordoba Gen. Cat. 28982	Comet very difficult.
26	20 58 43.83	+3.74	−27 7 12.5	+20.9	" " " 28872	Comet very difficult; poor observation.
27	20 48 39.78	+3.59	−25 56 31.3	+18.8	" " " 28662	
28	20 48 39.78	+3.59	−25 56 31.3	+18.8	" " " 28662	
29	20 48 39.78	+3.58	−25 56 31.3	+18.7	" " " 28662	Comet difficult.
30	20 52 12.84	+3.44	−24 56 18.0	+18.3	" " " 28724	Comet very difficult; poor observation.
31	21 2 20.51	+3.18	−22 43 29.3	+18.2	" " " 28969	
32	21 2 20.51	+3.16	−22 43 29.3	+18.1	" " " 28969	
33	21 7 31.24	+3.07	−21 41 2.5	+18.1	Algiers, A. G. Zones	Comet well seen.
34	21 35 11.08	+2.82	−18 2 21.7	+18.7	" " "	Rather difficult; comet appeared double, possibly a ft. star in the neighborhood.
35	21 35 11.08	+2.81	−18 2 21.7	+18.7	" " "	
36	21 35 49.37	+2.81	−17 59 22.3	+18.7	" " "	
37	21 47 20.09	+2.71	−16 15 40.0	+18.8	Washington, A. G. 8201	Very poor observation.
38	21 50 17.93	+2.70	−15 58 8.7	+19.0	" " 8216	Good observation.
39	21 51 31.68	+2.71	−16 4 36.1	+18.8	" " 8223	Not so good observation of comet as preceding.
40	21 49 43.25	+2.69	−15 42 56.6	+18.9	" " 8215	
41	22 20 21.70	+2.62	−12 24 2.4	+19.1	Camb., U. S., A. G. Zones	Comet well seen; nucleus visible at times, but observation rather poor on account of difficulty with illumination.
42	22 24 32.89	+2.63	−12 1 9.6	+19.1	" " " "	
43	22 28 33.71	+2.60	−11 1 13.8	+19.1	" " " "	
44	22 33 50.95	+2.60	−10 36 28.2	+19.0	" " " "	Comet fairly well seen.
45	22 34 21.97	+2.58	−10 5 29.4	+19.1	" " " "	Comet very difficult.
46	22 37 54.48	+2.58	− 9 39 41.2	+19.1	½ (Camb., U. S., A. G. Zones+Wien-Ottakring, A. G. 8095).	Comet very difficult; poor observation.
47	22 49 45.27	+2.58	− 8 31 35.1	+19.0	Wien-Ottakring, A. G. 8156	Comet very difficult; poor observation.
48	23 17 47.91	−0.50	− 4 52 28.4	− 1.1	Straszburg, A. G., 8041	Comet invisible half of the time, but came out very brightly at intervals.
49	23 35 19.33	−0.47	− 2 39 26.0	− 1.8	Micrometer comparison with— Straszburg, A. G. 8108 $\Delta\alpha = +0^m\ 51^s.59$, $\Delta\delta = +1'\ 45''.1$	Comet very difficult; poor observation.
50	23 35 19.96	−0.47	− 2 17 13.0	− 1.7	Straszburg, A. G. 8115	Comet very difficult.
51	23 40 21.50	−0.47	− 1 30 33.1	− 1.8	Nicolajew, A. G. 5887	Comet very difficult.
52	23 43 17.05	−0.46	− 1 18 28.2	− 2.0	" " 5895	Comet very difficult; poor observation.
53	23 47 47.52	−0.44	− 1 20 32.6	− 2.2	" " 5902	Comet very difficult.
54	0 15 13.92	−0.41	+ 2 30 2.4	− 3.2	Albany, A. G. 55	Comet very difficult; poor observation.
55	0 19 37.89	−0.40	+ 2 50 33.7	− 3.3	" " 72	
56	0 21 20.51	−0.40	+ 3 17 38.2	− 3.4	" " 79	Very poor observation.
57	0 24 40.60	−0.40	+ 3 51 0.0	− 3.6	" " 87	Very poor observation.
58	0 33 5.82	−0.38	+ 4 36 0.1	− 3.8	" " 135	Sky very transparent; comet surprisingly bright for so low an altitude.
59	0 41 8.40	−0.38	+ 5 33 51.1	− 4.0	Leipzig II, A. G. 253	Comet very difficult.

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COMET 1896 VII.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG pd.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 10	6 54 14	−0 42.28	+2 54.4	1 4 13.90	+5 43 24.2	8.990$_n$	0.682	1	20, 4	F.	12-inch
10	7 5 58	−1 9.73	+0 50.5	1 4 17.63	+5 43 10.7	8.874$_n$	0.681	2	15, 3	F.	" "
11	7 14 39	−0 48.77	−2 37.6	1 11 26.45	+5 18 1.6	8.805	0.686	3	18, 4	F.	" "
23	7 51 43	+3 29.53	+3 35.4	2 31 11.43	+1 16 18.4	8.734	0.728	4	20, 4	F.	" "
1897											
Jan. 6	7 5 39	−0 59.86	−1 35.9	3 43 16.83	−0 41 42.2	9.244$_n$	0.786	5	20, 4	F.	12-inch.
8	11 20 50	−1 39.59	−4 42.3	3 52 32.09	−0 46 37.8	9.477	0.746	6	20, 4	F.	" "
Feb. 4	9 19 0	+0 33.26	−1 2.4	5 19 8.00	+0 44 58.4	9.086	0.733	7	18, 5	Br.	26-inch
23	8 19 48	−0 8.60	−0 46.5	6 3 41.20	+2 41 47.0	8.815	0.714	8	6, 5	Br.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	1 4 52.00	+4.18	+5 40 2.3	+27.5	U. S. Naval Observatory transit circle position..	
2	1 5 23.18	+4.18	+5 41 52.7	+27.5	" " " " "	
3	1 12 11.01	+4.21	+5 20 12.0	+27.2	Albany, A. G. 353.....	
4	2 27 37.39	+4.51	+1 12 19.8	+23.2	" " 712.....	
5	3 44 14.99	+1.70	−0 40 12.0	+ 5.7	Nicolajew, A. G. 818.....	
6	3 54 9.96	+1.72	−0 42 0.9	+ 5.4	" " 859.....	
7	5 18 32.85	+1.89	+0 45 58.6	+ 2.2	" " 1295.....	
8	6 3 47.93	+1.87	+2 42 33.5	0.0	Micrometer comparison with— Albany, A. G. 2049 $\Delta\alpha = -0^m 37^s.61$..... $\Delta\delta = -10' 46''.8$.....	

COMET 1897 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG pd.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1896	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 6	8 36 36	+0 2.74	−0 18.8	20 15 7.54	+22 1 56.7	9.590	0.546	1	4, 8	Br.	26-inch
9	8 0 24	−0 13.85	+3 58.4	20 10 47.93	+19 43 46.8	9.551	0.556	2	4, 8	Br.	" "
25	6 10 48	+0 1.76	+5 31.0	19 56 8.32	+ 9 19 24.4	9.465	0.662	3	8, 4	Br.	" "
Dec. 9	7 6 55	−0 13.27	−0 20.7	19 50 43.46	+ 2 26 19.1	9.628	0.731	4	15, 3	F.	12-inch
10	6 0 39	+0 47.61	−8 14.4	19 50 30.95	+ 2 1 57.1	9.561	0.728	5	14, 4	F.	" "
11	6 42 24	−1 19.11	−3 3.7	19 50 18.15	+ 1 35 41.1	9.615	0.734	6	18, 4	F.	" "
23	6 37 1	+0 42.00	−1 52.6	19 48 49.55	− 3 0 45.6	9.646	0.747	7	20, 4	F.	" "
24	6 20 13	+0 51.64	+0 47.8	19 48 46.12	− 3 22 9.5	9.638	0.749	8	20, 4	F.	" "
30	6 27 27	−0 12.12	−6 20.1	19 48 35.26	− 5 25 12.2	9.655	0.748	9	5, 1	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	20 15 2.52	+2.28	+22 1 57.1	+18.4	Micrometer comparison with— Berlin B, A. G. 7637 $\Delta\alpha = -0^m 5^s.24$..... $\Delta\delta = -9' 46''.2$.....	

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COMET 1897 I—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
2	20 10 59.48	+2.30	+19 39 31.4	+17.0	Berlin A, A. G. 8063	
3	19 56 4.23	+2.33	+ 9 13 42.4	+11.0	Leipzig II, A. G. 9756	
4	19 50 54.30	+2.43	+ 2 26 32.5	+ 7.3	Albany, A. G. 6911	
5	19 49 40.91	+2.43	+ 2 10 4.5	+ 7.0	" " 6903	
6	19 51 34.81	+2.45	+ 1 38 37.8	+ 7.0	" " 6914	
7	19 48 4.98	+2.57	− 2 58 57.6	+ 4.6	Straszburg, A. G. 6855	
8	19 47 51.90	+2.58	− 3 23 1.7	+ 4.4	" " 6852	
9	19 48 44.73	+2.65	− 5 18 55.9	+ 3.8	" " 6857	

COMET D'ARREST.

[1897 II.]

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1897	h m s	m s	′ ″	h m s	° ′ ″						
July 9	15 19 6	−0 4.59	−2 47.1	2 31 58.39	+6 33 44.4	9.599_n	0.705	1	8,5	Br.	26-inch
28	15 9 36	+0 11.10	−2 1.1	3 18 45.09	+6 11 49.7	9.576_n	0.701	2	4,4	Br.	" "
29	15 3 12	−0 14.46	−5 20.6	3 20 55.03	+6 8 27.4	9.582_n	0.704	3	7,5	Br.	" "
30	15 10 24	+0 13.88	−2 27.7	3 23 6.20	+6 5 8.8	9.570_n	0.702	4	8,5	Br.	" "
Aug. 2	15 12 24	+0 18.87	−1 35.1	3 29 27.08	+5 54 9.0	9.559_n	0.702	5	8,5	Br.	" "
5	15 34 36	−0 15.08	−0 1.4	3 35 34.03	+5 41 9.7	9.512_n	0.699	6	8,4	Br.	" "
6	15 28 0	+0 10.85	−1 40.4	3 37 31.87	+5 36 31.5	9.521_n	0.700	7	9,5	Br.	" "
Sept. 3	15 34 0	+0 12.83	+0 4.9	4 19 34.58	+2 21 14.7	9.327	0.720	8	14,6	Br.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	2 32 0.95	+2.03	+6 36 15.3	+16.2	Micrometer comparison with— Leipzig II, A. G. 976 $\Delta\alpha = -1^m\ 12^s.36$ $\Delta\delta = +6'\ 0''.7$	Large proper motion suspected.
2	3 18 31.59	+2.40	+6 13 32.7	+18.1	Micrometer comparison with— Leipzig II, A. G. 1319 $\Delta\alpha = -11^m\ 30^s.44$ $\Delta\delta = +\ 9'\ 31''.3$	
3	3 21 7.07	+2.42	+6 13 29.8	+18.2	Micrometer comparison with— Leipzig II, A. G. 1319 $\Delta\alpha = -\ 8^m\ 54^s.96$ $\Delta\delta = +\ 9'\ 28''.4$	Comet faint, nebulous; slight condensation.
4	3 22 49.88	+2.44	+6 7 18.2	+18.3	Micrometer comparison with— Leipzig II, A. G. 1319 $\Delta\alpha = -\ 7^m\ 12^s.15$ $\Delta\delta = +\ 3'\ 16''.8$	
5	3 29 5.73	+2.48	+5 55 25.6	+18.5	Micrometer comparison with— Leipzig II, A. G. 1316 $\Delta\alpha = -\ 0^m\ 14^s.99$ $\Delta\delta = -\ 8'\ 58''.4$	
6	3 35 46.57	+2.54	+5 40 52.5	+18.6	Micrometer comparison with— Leipzig II, A. G. 1379 $\Delta\alpha = -\ 4^m\ 25^s.48$ $\Delta\delta = -\ 2'\ 45''.8$	
7	3 37 18.46	+2.56	+5 37 53.2	+18.7	Micrometer comparison with— Leipzig II, A. G. 1379 $\Delta\alpha = -\ 2^m\ 53^s.59$ $\Delta\delta = -\ 5'\ 45''.1$	Comet exceedingly faint; observation somewhat uncertain; thick haze.

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COMET D'ARREST—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
8	4 19 18.61	+3.14	+2 20 49.5	+20.3	Micrometer comparison with— Albany, A. G. 1292 .. $\Delta\alpha = +0^m\ 14^s.16$ ..... $\Delta\delta = +5'\ 34''.7$	

COMET 1897 III.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1897	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 18	11 8 4	−1 23.31	+5 54.7	3 23 45.98	+69 46 49.6	9.891_n	0.519_n	1	20, 4	F.	12-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	3 25 0.20	+9.09	+69 40 42.0	+12.9	Christiania, A. G. 604.....	

COMET 1898 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 25	16 57 0	+2 27.35	−2 6.8	21 40 42.09	+22 49 8.7	9.660_n	0.605	1	10, 2	F.	12-inch
Apr. 1	15 58 47	+1 6.46	+5 5.3	22 9 6.94	+29 47 19.3	9.717_n	0.631	2	20, 4	F.	" "
3	16 22 11	+2 8.01	−0 46.8	22 17 50.24	+31 42 53.9	9.718_n	0.582	3	20, 4	F.	" "
6	14 56 4	−1 37.67	+1 32.2	22 30 58.31	+34 25 25.9	9.739_n	0.706	4	20, 4	F.	" "
8	15 24 25	+3 57.52	−2 40.2	22 40 15.00	+36 12 31.3	9.753_n	0.656	5	10, 2	F.	" "
12	14 45 37	+1 11.79	+9 52.0	22 59 13.15	+39 30 26.0	9.763_n	0.711	6	18, 4	F.	" "
20	14 27 17	+5 15.89	+3 53.2	23 39 37.50	+45 13 9.6	9.789_n	0.735	7	10, 2	F.	" "
20	14 27 17	+2 53.46	−3 15.1	23 39 37.54	+45 13 12.0	9.789_n	0.735	8	10, 2	F.	" "
29	13 24 44	+0 11.21	+7 13.0	0 27 39.01	+50 3 3.0	9.752_n	0.828	9	14, 3	F.	" "
May 17	12 42 18	−4 4.53	−3 24.6	2 3 54.16	+55 12 53.8	9.668_n	0.888	10	20, 4	F.	" "
18	12 39 22	+0 59.49	+5 6.3	2 8 58.21	+55 21 24.6	9.659_n	0.891	11	17, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	21 38 14.37	+0.37	+22 51 21.5	−6.0	Berlin B, A. G. 8354.....	

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COMET 1898 I—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
2	22 8 0.18	+0.30	+29 42 19.2	−5.2	Camb., Eng., A. G. 13277	
3	22 15 41.96	+0.27	+31 43 45.8	−5.1	Leiden, A. G. 9430	
4	22 32 35.78	+0.20	+34 23 58.2	−4.5	" " 9585	
5	22 36 17.28	+0.20	+36 15 16.0	−4.5	Lund, A. G. 10823	
6	22 58 1.18	+0.18	+39 20 37.4	−3.4	" " 11022	
7	23 34 21.51	+0.10	+45 9 18.6	−2.2	Bonn, A. G. 18013	
8	23 36 43.99	+0.09	+45 16 29.1	−2.0	" " 18054	
9	0 27 27.69	+0.11	+49 55 49.8	+0.2	" " 410	
10	2 7 58.26	+0.43	+55 16 15.4	+3.0	Hels.-Gotha, A. G. 1995	
11	2 7 58.26	+0.46	+55 16 15.4	+2.9	" " " 1995	

COMET 1898 V.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
June 21	13 12 46	−1 27.03	− 6 50.1	19 59 10.78	−22 4 38.6	8.979_n	0.882	1	12, 5	Br.	26-inch
22	12 8 2	−0 24.08	+11 56.4	19 46 16.38	−22 16 26.1	9.288_n	0.874	2	20, 4	F.	12-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	20 0 33.67	+4.14	−21 57 58.2	+9.7	Paris 27404	
2	19 46 36.23	+4.23	−22 28 31.0	+8.5	Algiers, A. G. Zones	

COMET 1898 VI.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
June 20	13 17 25	−2 7.21	−2 0.8	4 4 33.96	+57 10 0.4	9.795_n	0.836	1	5, 1	F.	12-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	4 6 39.61	+1.56	+57 11 59.6	+1.6	Hels.-Gotha, A. G. 3434	

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COMET 1898 VII.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. Δα	COMET–STAR. Δδ	COMET'S APPARENT α	COMET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
June 20	10 33 22	+0 21.29	+5 44.5	15 53 54.50	−30 47 4.5	8.931	0.913	1	24,5	F.	12-inch
22	11 3 27	−1 4.54	+5 14.2	15 46 40.85	−31 58 25.2	9.277	0.906	2	20,4	F.	" "
24	9 44 44	+2 40.12	+0 15.7	15 39 43.33	−33 4 50.7	8.634	0.921	3	18,4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	15 53 28.92	+4.29	−30 52 33.1	−15.9	Cordoba Gen. Cat. 21664	
2	15 47 41.09	+4.30	−32 3 22.6	−16.8	Cordoba Zones XV^h, 3237	
3	15 36 58.96	+4.25	−33 4 48.3	−18.1	Cordoba Gen. Cat. 21293	

COMET 1898 IX.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. Δα	COMET–STAR. Δδ	COMET'S APPARENT α	COMET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 17	16 42 10	−0 1.86	+2 4.9	10 5 48.17	+28 22 37.0	9.713_n	0.651	1	15,3	F.	12-inch
18	16 23 20	−0 27.50	−10 32.8	10 12 0.61	+27 44 42.4	9.713_n	0.682	2	20,4	F.	" "
23	16 47 52	−1 8.74	+7 16.9	10 43 58.69	+24 3 46.8	9.698_n	0.683	3	15,3	F.	" "
27	16 32 46	+0 43.40	−1 16.6	11 9 45.98	+20 33 38.9	9.688_n	0.719	4	25,5	F.	" "
28	16 46 15	+1 46.80	−2 14.6	11 16 17.18	+19 35 57.8	9.686_n	0.712	5	20,4	F.	" "
29	16 27 23	+0 18.54	.....	11 22 41.26	.....	9.681_n	.....	6	18,.	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	10 5 47.09	+2.34	+28 20 45.5	−13.4	Camb., Eng., A. G. 5241	
2	10 12 25.78	+2.33	+27 55 28.8	−13.6	" " " 5290	
3	10 45 5.17	+2.26	+23 56 44.4	−14.5	Berlin B, A. G. 4114	
4	11 9 0.37	+2.21	+20 35 10.3	−14.8	" " " 4217	
5	11 14 28.18	+2.20	+19 38 27.2	−14.8	Berlin A, A. G. 4407	
6	11 22 20.55	+2.17	+18 29 30.3	....	" " " 4432	

COMET 1898 X.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. Δα	COMET–STAR. Δδ	COMET'S APPARENT α	COMET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1898	h m s	m s	′ ″	h m s	° ′ ″						
[illegible]	[illegible]	[illegible]	[illegible]	15 22 3.24	+55 47 28.5	9.910	0.450	1	24,5	F.	12-inch

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COMET 1898 X—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1898	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 23	10 24 19	+3 11.99	+ 5 17.3	15 43 16.51	+52 46 8.7	9.744	0.847$_n$	2	20, 4	F.	12-inch
24	7 8 30	+0 17.07	+ 8 56.0	15 57 26.53	+50 20 3.0	9.850	0.431	3	20, 4	F.	" "
27	6 51 20	+2 27.73	− 4 16.2	16 35 45.67	+41 31 24.6	9.759	0.412	4	20, 4	F.	" "
28	7 49 36	−0 29.11	−11 53.4	16 46 2.47	+38 27 37.3	9.763	0.580	5	25, 5	F.	" "
Nov. 1	7 3 7	+0 3.03	+10 43.5	17 15 24.46	+27 34 9.7	9.680	0.568	6	20, 4	F.	" "
2	6 52 40	+2 37.94	+ 6 50.8	17 20 55.59	+25 5 53.1	9.661	0.575	7	20, 4	F.	" "
3	6 39 26	−0 17.62	−12 1.6	17 25 54.51	+22 45 8.6	9.640	0.581	8	20, 4	F.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	15 22 25.05	−0.29	+55 58 5.4	−7.0	Hels.-Gotha, A. G. 8363	
2	15 40 4.52	0.00	+52 40 56.2	−4.8	Camb., U. S., A. G. 4821	
3	15 57 9.26	+0.20	+50 11 9.7	−2.7	" " " 4886	
4	16 33 17.13	+0.81	+41 35 39.6	+1.2	Bonn, A. G. 10632	
5	16 46 30.59	+0.99	+38 39 28.1	+2.6	Lund, A. G. 6909	
6	17 15 19.85	+1.58	+27 23 21.6	+4.6	Camb., Eng., A. G. 8135	
7	17 18 15.97	+1.68	+24 58 57.8	+4.5	" " " 8165	
8	17 26 10.35	+1.78	+22 57 5.2	+5.0	Berlin B, A. G. 6003	

COMET 1899 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
June 4	10 34 48	−0 46.90	+0 15.4	16 55 52.59	+52 27 49.2	9.447$_n$	0.229$_n$	1	8, 3	Br.	26-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″.		
1	16 56 36.22	+3.27	+52 27 38.6	−4.8	Camb., U. S., A. G. 5130	

COMET 1899 V.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1899	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 3	7 40 14	−3 43.17	+ 1 53.4	16 34 12.60	−3 55 38.6	9.594	0.758	1	19, 4	See	12-inch
4	7 31 21	−2 19.42	+20 41.2	16 35 36.33	−3 36 50.8	9.587	0.757	2	5, 6	See	" "

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COMET 1902 III—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	3 14 7.52	+4.07	+36 20 4.8	+ 1.3	Lund, A. G. 1719	Seeing 5.
2	3 14 36.17	+4.07	+36 13 15.0	+ 1.2	Micrometer comparison with— Lund, A. G. 1719 $\Delta\alpha = +0^m\ 28^s.65$, $\Delta\delta = -6'\ 49''.9$	Seeing excellent.
3	3 13 12.35	+4.11	+36 31 11.1	+ 1.4	Lund, A. G. 1712	Seeing 4.
4	3 13 12.35	+4.11	+36 31 11.1	+ 1.4	" " 1712	Seeing excellent.
5	3 13 12.35	+4.11	+36 31 11.1	+ 1.4	" " 1712	
6	3 12 11.00	+4.17	+37 11 57.0	+ 1.4	" " 1704	Seeing fair.
7	3 10 41.60	+4.17	+37 15 26.0	+ 1.5	" " 1689	Sky very thick; nucleus about same as on Sept. 5 but nebulosity more scattering.
8	3 9 41.37	+4.24	+37 36 31.7	+ 1.7	" " 1680	Seeing excellent.
9	3 9 41.37	+4.24	+37 36 31.7	+ 1.7	" " 1680	Seeing 5.
10	2 58 8.34	+4.53	+39 54 35.1	+ 2.8	" " 1572	Seeing 4.
11	2 58 8.34	+4.53	+39 54 35.1	+ 2.8	" " 1572	
12	2 33 30.63	+5.10	+45 29 50.8	+ 5.4	Bonn, A. G. 2242	
13	1 51 14.65	+5.68	+50 39 12.6	+10.4	Camb., U. S., A. G. 907	Hazy; comet obscured at times; poor observation.
14	0 5 21.22	+5.84	+56 37 12.5	+23.6	Hels.-Gotha, A. G. 61	
15	0 5 21.22	+5.84	+56 37 12.5	+23.6	" " " 61	
16	23 5 53.84	+5.21	+56 55 2.8	+29.6	" " " 13805	
17	22 34 46.17	+4.75	+56 17 12.1	+32.1	" " " 13309	Seeing 3.
18	22 34 46.17	+4.75	+56 17 12.1	+32.1	" " " 13309	
19	22 34 46.17	+4.75	+56 17 12.1	+32.1	" " " 13309	
20	22 4 9.10	+4.26	+55 15 57.3	+33.9	" " " 12849	
21	20 9 31.85	+2.58	+44 51 54.3	+34.7	Bonn, A. G. 13908	
22	18 31 8.10	+2.02	+21 39 52.7	+24.2	Berlin B, A. G. 6550	
23	18 21 58.76	+2.00	+18 48 44.1	+22.6	Berlin A, A. G. 6794	
24	18 23 7.42	+2.02	+18 40 50.6	+22.7	" " " 6807	
25	17 38 54.02	+2.05	+ 2 3 7.7	+14.0	Albany, A. G. 5893	Nucleus of comet obscured by wires; very poor observation.
26	17 34 57.62	+2.04	+ 0 48 42.0	+13.2	" " 5871	Clouds.
27	17 19 2.63	+2.03	− 5 14 5.5	+10.1	Warsaw 4117	
28	17 14 44.80	+2.02	− 5 48 41.4	+ 9.6	Radcliffe 1890, 4510	Very poor observation.
29	17 11 54.90	+2.02	− 6 40 38.8	+ 9.2	Wien-Ottakring, A. G. 5883	
30	8 2 0.29	+2.27	−33 17 30.7	−17.4	Cordoba Gen. Cat. 10728	
31	8 2 0.29	+2.27	−33 17 30.7	−17.4	" " " 10728	
32	6 53 0.03	+1.70	−18 6 56.3	−20.7	Washington, A. G. 2359	
33	6 52 8.91	+1.69	−17 26 15.5	−20.7	" " 2349	Seeing good at first, but images became diffuse and comet was scarcely discernible.
34	6 50 13.58	+1.67	−16 38 4.8	−20.7	" " 2326	Measures interrupted by the failure of the illumination.
35	6 47 14.90	+1.64	−15 42 50.0	−20.6	" " 2308	
36	6 42 7.78	+1.58	−14 25 13.9	−20.4	" " 2262	
37	6 41 37.14	+1.56	−13 44 10.1	−20.3	Camb., U. S., A. G. Zones	
38	6 36 26.79	+1.47	−12 5 30.5	−20.1	" " " "	
39	6 35 1.40	+1.43	−10 47 46.3	−19.9	" " " "	
40	6 31 11.99	+1.39	−10 22 55.7	−19.9	" " " "	
41	6 23 0.63	+1.15	− 4 52 18.8	−18.6	Straszburg, A. G. 2108	
42	6 23 45.11	+1.14	− 4 31 1.4	−18.6	" " 2120	
43	6 25 30.18	+1.12	− 3 54 10.8	−18.5	Micrometer comparison with— Radcliffe 1890, 1614 $\Delta\alpha = -0^m\ 27^s.37$, $\Delta\delta = -15'\ 24''.3$	
44	6 23 58.89	+1.03	− 2 26 49.6	−17.8	Straszburg, A. G. 2122	
45	6 23 26.87	+1.01	− 2 16 17.3	−17.8	Micrometer comparison with— Straszburg, A. G. 2102 $\Delta\alpha = +0^m\ 45^s.32$, $\Delta\delta = -7'\ 15''.8$	Comet difficult.

COMET 1903 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 21	6 39 31	+0 58.85	+1 24.0	23 0 6.83	+2 47 44.2	9.574	0.724	1	9,4	D.	26-inch

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COMET 1903 I—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 22	6 33 43	−1 53.79	−0 49.5	23 1 10.86	+ 3 2 7.8	9.570	0.722	2	9, 4	Fk.	26-inch
23	6 51 4	+3 21.25	−0 59.6	23 2 17.39	+ 3 16 54.8	9.595	0.723	3	20, 8	Fk.	" "
30	6 46 22	+0 31.61	+9 4.6	23 10 41.65	+ 5 7 13.5	9.611	0.716	4	10, 10	Fk.	" "
Feb. 5	6 46 29	+1 15.73	−4 17.8	23 18 53.17	+ 6 53 3.1	9.627	0.711	5	40, 8	Fk.	" "
6	6 40 54	−0 11.95	−3 18.8	23 20 21.01	+ 7 11 40.9	9.624	0.708	6	10, 8	Fk.	" "
9	7 8 26	+1 46.03	+4 0.4	23 24 55.10	+ 8 9 52.9	9.649	0.715	7	30, 8	Fk.	" "
12	7 0 14	+3 16.97	−3 13.3	23 29 42.19	+ 9 10 23.0	9.650	0.711	8	30, 6	Fk.	" "
17	7 17 23	−0 13.47	−6 25.1	23 38 17.58	+10 57 26.8	9.663	0.716	9	10, 10	Fk.	" "
19	7 15 19	+7 57.27	+2 22.1	23 41 55.34	+11 41 49.6	9.665	0.716	10	15, 3	Fk.	" "
20	6 42 55	−0 13.45	−1 44.2	23 43 44.40	+12 3 53.0	9.654	0.699	11	10, 10	Fk.	" "
22	6 50 58	−0 25.22	−7 0.2	23 47 33.17	+12 49 23.7	9.661	0.702	12	10, 10	Fk.	" "
23	7 3 13	+3 4.12	−1 15.8	23 49 30.52	+13 12 21.5	9.667	0.709	13	19, 4	Fk.	" "
25	7 10 53	+0 26.82	−2 17.4	23 53 28.23	+13 57 59.7	9.671	0.713	14	10, 10	Fk.	" "
26	7 7 37	+4 21.33	+2 11.3	23 55 28.25	+14 20 15.0	9.671	0.711	15	19, 4	K.	12-inch
Mar. 3	7 18 58	+2 32.75	+3 35.4	0 5 41.54	+16 5 32.8	9.677	0.720	16	28, 6	K.	" "
4	7 19 44	−0 25.82	+0 36.9	0 7 43.82	+16 23 42.7	9.678	0.721	17	33, 9	K.	" "
12	7 4 31	+0 1.66	−6 59.6	0 21 58.90	+17 14 59.1	9.680	0.720	18	25, 7	K.	" "
13	6 45 39	−1 25.59	−3 0.2	0 23 14.56	+17 1 26.8	9.678	0.719	19	5, 1	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	22 59 8.27	−0.29	+ 2 46 17.5	+2.7	Albany, A. G. 7960	
2	23 3 4.93	−0.28	+ 3 2 54.7	+2.6	" " 7980	
3	22 58 56.44	−0.30	+ 3 17 51.7	+2.7	" " 7957	Seeing very bad; comet scarcely discernible.
4	23 10 10.31	−0.27	+ 4 58 6.7	+2.2	" " 8028	
5	23 17 37.73	−0.29	+ 6 57 19.1	+1.8	Leipzig II, A. G. 11622	
6	23 20 33.22	−0.26	+ 7 14 57.9	+1.8	" " " 11641	
7	23 23 9.32	−0.25	+ 8 5 50.8	+1.7	" " " 11652	
8	23 26 25.45	−0.23	+ 9 13 34.7	+1.6	" " " 11676	
9	23 38 31.28	−0.23	+11 3 50.8	+1.1	Leipzig I, A. G. 9412	
10	23 33 58.31	−0.24	+11 39 26.4	+1.1	" " " 9387	
11	23 43 58.05	−0.20	+12 5 36.3	+0.9	" " " 9451	
12	23 47 58.58	−0.19	+12 56 23.1	+0.8	" " " 9469	
13	23 46 26.59	−0.19	+13 13 36.5	+0.8	" " " 9461	
14	23 53 1.59	−0.18	+14 0 16.5	+0.6	" " " 9505	
15	23 51 7.12	−0.20	+14 18 3.1	+0.6	" " " 9490	Seeing excellent.
16	0 3 8.96	−0.17	+16 1 57.4	0.0	Berlin A, A. G. 11	Seeing good.
17	0 8 9.80	−0.16	+16 23 5.9	−0.1	" " " 30	Seeing good.
18	0 21 57.38	−0.14	+17 21 59.5	−0.8	" " " 100	Seeing good.
19	0 24 40.29	−0.14	+17 4 28.0	−1.0	" " " 119	

COMET 1903 II.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1902	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 3	12 31 0	+0 5.42	−8 44.8	7 17 24.29	−1 49 59.1	9.353_n	0.755	1	1, 1	D.	26-inch
5	13 42 11	+1 12.37	+0 3.5	7 16 49.46	−1 32 48.3	8.879_n	0.754	2	15, 2	D.	" "
7	11 50 15	−0 20.33	+2 28.5	7 16 12.07	−1 15 30.3	9.424_n	0.750	3	10, 10	D.	" "
8	12 18 28	+0 9.67	−4 16.8	7 15 50.49	−1 5 58.5	9.322_n	0.749	4	10, 10	D.	" "

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COMET 1903 II—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1902	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 9	11 15 51	−0 11.79	+ 5 0.3	7 15 29.05	− 0 56 41.6	9.485$_n$	0.747	5	10, 10	D.	26-inch
18	12 26 28	−0 48.39	+ 1 35.1	7 11 15.14	+ 0 44 20.3	9.053$_n$	0.733	6	15, 2	D.	" "
26	10 44 23	+0 3.01	+ 3 22.9	7 6 27.17	+ 2 33 14.7	9.370$_n$	0.718	7	10, 10	D.	" "
1903											
Jan. 17	12 12 30	+0 6.91	+ 0 40.9	6 50 39.24	+ 9 0 33.8	9.129	0.644	8	10, 10	D.	26-inch
18	8 17 49	−0 21.83	+10 7.0	6 50 4.48	+ 9 16 59.9	9.481$_n$	0.662	9	10, 10	D.	" "
22	11 27 30	−0 37.19	− 3 35.0	6 47 17.19	+10 38 44.6	8.963	0.619	10	10, 10	D.	" "
Feb. 4	9 36 5	−0 37.13	+ 0 57.8	6 40 12.42	+14 56 34.3	8.454$_n$	0.550	11	18, 8	D.	" "
5	8 28 12	−0 49.44	− 1 40.1	6 39 49.28	+15 15 20.4	9.163$_n$	0.555	12	39, 10	D.	" "
22	7 55 39	+2 16.08	− 3 10.9	6 36 31.16	+20 31 5.7	8.856$_n$	0.443	13	29, 6	D.	" "
23	8 4 14	−0 5.99	+ 0 19.0	6 36 33.63	+20 48 27.2	8.658$_n$	0.434	14	10, 10	D.	" "
26	8 33 44	−0 20.89	− 1 37.7	6 36 51.07	+21 39 24.8	8.627	0.413	15	10, 10	D.	" "
Mar. 1	9 0 18	−0 7.49	− 6 39.0	6 37 23.71	+22 28 40.0	9.091	0.405	16	10, 10	D.	" "
3	10 31 39	−1 11.79	+ 5 21.3	6 37 54.55	+23 1 20.8	9.496	0.474	17	32, 6	D.	" "
17	9 15 19	−0 24.84	− 3 36.2	6 44 23.85	+26 20 55.9	9.434	0.371	18	10, 10	D.	" "
18	9 56 34	−0 49.08	+ 3 25.8	6 45 4.72	+26 34 15.9	9.545	0.430	19	25, 5	D.	" "
Apr. 17	8 34 15	+1 11.47	+ 4 4.7	7 15 14.85	+31 36 43.0	9.577	0.328	20	12, 6	D.	" "
18	8 45 10	−1 17.54	+ 6 42.0	7 16 34.34	+31 44 17.6	9.602	0.356	21	11, 6	D.	" "
27	9 33 32	+0 20.56	− 6 12.8	7 29 8.03	+32 44 51.5	9.696	0.494	22	10, 10	D.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	7 17 14.61	+4.26	− 1 41 1.8	−12.5	Nicolajew, A. G. 2142	Comet faint; clouds interrupting.
2	7 15 32.77	+4.32	− 1 32 39.1	−12.7	" " 2130	
3	7 16 28.05	+4.35	− 1 17 45.7	−13.1	¼ (Mün. I, 2487+3 Mün. II, 1827)	
4	7 15 36.44	+4.38	− 1 1 28.5	−13.2	Nicolajew, A. G. 2131	
5	7 15 36.44	+4.40	− 1 1 28.5	−13.4	" " 2131	
6	7 11 58.88	+4.65	+ 0 43 0.3	−15.1	" " 2097	
7	7 6 19.35	+4.81	+ 2 30 7.9	−16.1	Albany, A. G. 2677	
8	6 50 30.39	+1.94	+ 9 0 5.5	−12.6	Leipzig II, A. G. 3353	
9	6 50 24.38	+1.93	+ 9 7 5.5	−12.6	" " " 3348	
10	6 47 52.44	+1.94	+10 42 32.4	−12.8	Leipzig I, A. G. 2557	
11	6 40 47.65	+1.90	+14 55 48.8	−12.3	" " " 2477	Seeing bad.
12	6 40 36.82	+1.90	+15 17 12.8	−12.3	Berlin A, A. G. 2369	
13	6 34 13.28	+1.80	+20 34 27.4	−10.8	Berlin B, A. G. 2511	
14	6 36 37.82	+1.80	+20 48 19.0	−10.8	" " " 2535	
15	6 37 10.21	+1.75	+21 41 12.9	−10.4	" " " 2543	
16	6 37 29.50	+1.70	+22 35 29.0	−10.0	" " " 2545	
17	6 39 4.67	+1.67	+22 56 9.4	− 9.9	" " " 2564	
18	6 44 47.21	+1.48	+26 24 40.7	− 8.6	Camb., Eng., A. G. 3532	
19	6 45 52.33	+1.47	+26 30 58.7	− 8.6	" " " 3547	
20	7 14 2.34	+1.04	+31 32 45.3	− 7.0	Leiden, A. G. 3076	Comet as faint as at time of discovery.
21	7 17 50.84	+1.04	+31 37 42.6	− 7.0	" " 3113	
22	7 28 46.58	+0.89	+32 51 10.8	− 6.5	" " 3192	

COMET 1903 IV.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
June 29	15 2 52	+1 40.09	+6 33.4	21 42 52.63	+0 55 6.5	8.346$_n$	0.732	1	29, 6	K.	12-inch
30	14 53 17	+0 56.88	+0 54.8	21 40 53.07	+2 33 58.7	8.470$_n$	0.715	2	30, 6	K.	" "
July 1	15 5 8	+1 16.18	−4 27.6	21 38 35.79	+4 19 22.1	7.822	0.696	3	30, 6	K.	" "
2	14 59 28	+3 4.92	+2 46.7	21 36 1.35	+6 13 58.6	7.922	0.674	4	30, 6	K.	" "

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COMET 1903 IV—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1903	h m s	m s	′ ″	h m s	° ′ ″						
July 6	15 32 42	+2 42.58	+ 7 9.6	21 21 19.32	+16 12 16.5	9.143	0.538	5	30, 6	K.	12-inch
7	14 40 8	+0 40.32	− 1 6.2	21 16 21.76	+19 15 39.7	8.707	0.469	6	30, 6	K.	" "
7	15 2 25	−1 22.40	− 4 49.1	21 16 16.62	+19 18 45.8	8.990	0.472	7	30, 6	K.	" "
8	14 57 51	+2 39.44	+ 6 52.8	21 10 16.45	+22 48 7.2	9.047	0.394	8	30, 6	K.	" "
9	14 28 35	+1 6.94	+ 1 42.3	21 3 20.32	+26 34 4.3	8.871	0.275	9	30, 6	K.	" "
13	13 1 32	−0 23.00	+ 6 34.6	20 18 23.04	+44 45 26.7	8.287	9.964_n	10	14, 3	K.	" "
15	11 50 2	+1 38.90	+ 2 40.8	19 37 31.33	+54 27 10.6	8.741_n	0.374_n	11	30, 6	K.	" "
17	9 49 8	−2 15.62	+13 16.9	18 34 28.84	+62 39 50.0	9.454_n	0.520_n	12	20, 4	K.	" "
21	9 32 36	−4 48.89	+ 5 20.9	15 14 4.51	+68 30 34.0	9.836	0.521_n	13	24, 5	K.	" "
23	9 59 29	−0 41.19	+ 9 28.2	13 53 3.68	+65 59 44.4	9.998	9.831_n	14	29, 6	K.	" "
28	8 44 49	−3 35.45	−11 17.1	12 16 49.37	+57 7 44.1	9.905	0.100	15	30, 6	K.	" "
Aug. 5	9 0 24	−1 25.91	+ 0 55.0	11 22 36.37	+46 35 49.7	9.819	0.650	16	30, 6	K.	" "
11	8 43 1	+2 58.13	+ 1 51.8	11 0 37.11	+41 3 22.0	9.768	0.725	17	20, 4	K.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	21 41 9.89	+2.65	+ 0 48 17.4	+15.7	Nicolajew, A. G. 5509	
2	21 39 53.50	+2.69	+ 2 32 48.5	+15.4	Albany, A. G. 7593	
3	21 37 16.88	+2.73	+ 4 23 34.6	+15.1	" " 7580	
4	21 32 53.66	+2.77	+ 6 10 57.0	+14.9	Leipzig II, A. G. 10845	
5	21 18 33.80	+2.94	+16 4 53.1	+13.8	Berlin A, A. G. 8723	
6	21 15 38.45	+2.99	+19 16 32.4	+13.5	" " " 8695	
7	21 17 36.03	+2.99	+19 23 21.5	+13.4	Newcomb's Fund. Cat. 1399	
8	21 7 33.96	+3.05	+22 41 1.2	+13.2	Berlin B, A. G. 8126	
9	21 2 10.28	+3.10	+26 32 9.1	+12.9	Camb., Eng., A. G. 12121	
10	20 18 42.64	+3.40	+44 38 39.1	+13.0	Bonn, A. G. 14116	Clouds.
11	19 35 48.91	+3.52	+54 24 15.2	+14.6	Camb., U. S., A. G. 6117	
12	18 36 41.09	+3.37	+62 26 16.1	+17.0	Hels.-Gotha, A. G. 9906	
13	15 18 52.66	+0.74	+68 24 55.5	+17.6	Christiania, A. G. 2298	
14	13 53 45.02	−0.15	+65 50 3.1	+13.1	" " 2079	
15	12 20 25.02	−0.20	+57 18 56.1	+ 5.1	Hels.-Gotha, A. G. 7156	
16	11 24 2.14	+0.14	+46 34 56.4	− 1.7	Bonn, A. G. 8060	
17	10 57 38.67	+0.31	+41 1 35.2	− 5.0	" " 7881	Seeing unsteady.

COMET 1904 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 17	10 39 8	−0 37.74	−1 59.3	16 55 50.18	+44 51 30.1	9.778_n	0.325	1	10, 10	Fk.	26-inch
17	10 50 56	−0 39.05	−1 39.3	16 55 48.87	+44 51 50.1	9.768_n	0.275	2	24, 8	Hd.	12-inch
17	15 47 0	−1 13.42	+6 8.1	16 55 14.51	+44 59 37.6	9.004	9.954	3	30, 6	Hd.	" "
18	11 29 0	−1 28.10	−5 45.6	16 52 56.79	+45 30 18.6	9.723_n	9.994	4	29, 6	Hd.	" "
19	10 45 49	+3 41.26	−2 38.2	16 50 8.42	+46 6 16.4	9.770_n	0.202	5	29, 6	Hd.	" "
20	10 34 51	−0 5.10	−6 11.3	16 47 10.97	+46 42 22.7	9.778_n	0.206	6	35, 7	Hd.	" "
21	11 10 46	−2 47.92	+3 3.2	16 44 1.71	+47 19 18.5	9.734_n	9.864	7	29, 6	Hd.	" "
22	12 24 58	+3 57.38	+2 40.1	16 40 41.09	+47 56 25.0	9.571_n	9.764_n	8	30, 6	Hd.	" "
23	15 9 28	−3 0.75	−0 16.6	16 37 1.73	+48 34 47.9	9.081	0.154_n	9	30, 6	Hd.	" "
30	11 41 20	+0 11.27	−2 43.7	16 11 59.28	+52 9 38.0	9.557_n	0.134_n	10	30, 5	Hd.	" "
May 1	9 4 33	+2 51.65	−0 29.8	16 8 25.79	+52 34 24.0	9.838_n	0.065	11	30, 6	Hd.	" "
2	10 4 7	+2 2.06	+3 8.6	16 4 10.77	+53 2 20.9	9.761_n	9.409_n	12	10, 2	Hd.	" "
3	11 13 21	+2 36.66	+4 4.9	15 59 49.41	+53 29 23.9	9.584_n	0.176_n	13	30, 6	Hd.	" "
4	8 57 52	−4 55.25	+9 51.4	15 55 59.23	+53 51 47.8	9.835_n	9.808	14	20, 4	Hd.	" "

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COMET 1904 I—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
May 5	10 18 12	−1 35.51	− 1 47.8	15 51 26.55	+54 16 41.7	9.700_n	0.029_n	15	30, 6	Hd.	12-inch
7	8 32 10	+2 42.89	+ 8 46.6	15 42 58.34	+54 59 7.4	9.848_n	9.732	16	30, 6	Hd.	" "
8	8 35 58	+0 28.89	+ 3 28.9	15 38 28.44	+55 19 32.5	9.839_n	9.379	17	35, 7	Hd.	" "
9	10 40 16	+2 33.52	+ 3 4.9	15 33 32.86	+55 40 21.5	9.548_n	0.300_n	18	9, 2	Hd.	" "
10	8 42 21	−0 45.69	+ 2 29.0	15 29 21.04	+55 56 49.6	9.816_n	9.499_n	19	30, 6	Hd.	" "
11	10 13 57	+0 37.20	+11 30.3	15 24 26.81	+56 14 40.4	9.589_n	0.294_n	20	30, 6	Hd.	" "
12	10 32 1	+6 15.73	+ 8 36.1	15 19 44.49	+56 30 28.7	9.481_n	0.360_n	21	15, 3	Hd.	" "
13	10 42 46	−4 47.32	− 6 17.8	15 15 2.73	+56 44 58.5	9.377_n	0.394_n	22	25, 5	Hd.	" "
15	9 42 59	+0 40.01	+ 5 29.3	15 5 52.44	+57 9 46.8	9.588_n	0.330_n	23	30, 6	Hd.	" "
16	11 46 42	−2 12.95	− 7 26.0	15 0 47.00	+57 21 38.9	8.943	0.444_n	24	29, 6	Hd.	" "
19	10 38 3	−1 10.53	− 1 10.2	14 47 1.98	+57 47 11.3	8.862_n	0.454_n	25	18, 6	Hd.	" "
20	9 7 59	−2 31.83	+ 8 38.7	14 42 42.64	+57 53 14.1	9.567_n	0.366_n	26	25, 5	Hd.	" "
21	9 59 39	+4 21.51	+ 0 21.2	14 37 58.49	+57 58 56.4	9.186_n	0.448_n	27	25, 5	Hd.	" "
22	9 53 10	−4 1.85	− 4 6.7	14 33 28.06	+58 3 25.1	9.166_n	0.451_n	28	20, 4	Hd.	" "
23	10 53 30	+2 59.35	− 4 0.5	14 28 47.24	+58 7 0.1	9.053	0.458_n	29	25, 5	Hd.	" "
25	15 1 1	−0 22.90	+ 4 22.0	14 19 14.63	+58 11 13.2	9.921	0.109	30	20, 4	Hd.	" "
June 3	10 0 52	+0 11.92	+ 4 37.9	13 44 13.92	+57 48 55.9	9.382	0.422_n	31	30, 6	Hd.	" "
8	9 46 36	−0 58.82	− 2 57.7	13 27 23.47	+57 14 32.4	9.498	0.376_n	32	30, 6	Hd.	" "
13	9 45 22	+0 26.82	+ 8 52.8	13 12 50.99	+56 29 32.3	9.618	0.281_n	33	25, 5	Hd.	" "
14	9 42 58	+2 29.30	− 6 46.6	13 10 12.40	+56 19 38.1	9.630	0.263_n	34	25, 5	Hd.	" "
22	9 19 20	−3 21.19	+ 3 31.3	12 52 11.80	+54 52 45.9	9.686	0.107_n	35	25, 5	Hd.	" "
July 1	10 42 30	−6 26.35	+ 7 44.4	12 37 26.19	+53 6 31.9	9.857	0.181	36	20, 4	R.	" "
Aug. 12	9 37 16	−0 31.26	− 1 55.7	12 15 47.68	+46 1 0.2	9.810	0.681	37	30, 6	R.	26-inch
Sept. 4	8 45 20	−1 52.43	+ 1 53.1	12 19 24.84	+43 40 53.1	9.773	0.749_n	38	30, 6	R.	" "
11	8 0 18	+2 55.85	− 1 50.8	12 21 24.18	+43 13 18.4	9.782	0.720	39	20, 4	R.	" "
15	7 48 2	+3 35.28	− 3 36.5	12 22 39.01	+43 0 47.7	9.779	0.724	40	25, 5	R.	" "
Oct. 15	16 27 34	+3 26.30	− 3 51.3	12 32 52.47	+42 51 6.4	9.792_n	0.661	41	25, 5	R.	" "
16	16 32 3	+3 44.98	− 1 22.6	12 33 11.17	+42 53 34.7	9.794_n	0.646	42	25, 5	R.	" "
17	16 25 37	+4 3.67	+ 1 15.9	12 33 29.87	+42 56 12.9	9.793_n	0.651	43	25, 5	R.	" "
Nov. 11	17 4 34	+0 43.96	+ 0 46.9	12 38 54.91	+45 9 15.1	9.760_n	0.212	44	35, 7	R.	" "
16	16 36 35	−1 26.71	− 5 35.2	12 39 10.28	+45 51 58.7	9.773_n	0.236	45	25, 5	R.	" "
1905											
Feb. 4	9 31 1	−4 18.63	− 8 12.1	10 43 3.86	+63 54 57.0	9.968_n	9.527_n	46	20, 4	R.	26-inch
10	15 22 36	+1 40.56	+ 1 49.0	10 20 20.93	+64 26 41.2	9.797	0.417_n	47	30, 6	R.	" "
24	10 50 18	−4 0.53	− 6 44.4	9 31 8.44	+64 18 52.0	9.032_n	0.575_n	48	24, 5	R.	" "
26	13 43 37	−3 12.64	+ 1 48.5	9 24 12.62	+64 9 5.2	9.840	0.350_n	49	16, 4	R.	" "
Mar. 25	9 27 10	−1 39.54	− 7 10.0	8 21 40.87	+60 6 43.5	9.481	0.458_n	50	30, 6	Fn.	" "
30	10 8 2	+1 5.34	−14 27.9	8 15 1.23	+59 9 15.1	9.720	0.287	51	30, 6	Fn.	" "
Apr. 8	11 7 23	−2 20.20	+ 1 49.1	8 6 14.36	+57 25 19.7	9.875	9.400	52	25, 5	Fn.	" "
22	10 27 14	−0 9.74	+ 1 50.9	7 59 1.03	+54 50 8.4	9.865	0.012	53	10, 10	Fn.	" "
23	10 44 8	+3 38.41	− 5 30.4	7 58 44.57	+54 39 27.1	9.878	0.185	54	20, 4	Fn.	" "
June 1	9 47 32	+0 16.50	+ 7 2.8	8 3 8.42	+48 46 15.9	9.839	0.620	55	6, 8	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	16 56 26.34	+1.58	+44 53 36.7	−7.3	Bonn, A. G. 10878	
2	16 56 26.34	+1.58	+44 53 36.7	−7.3	" " 10878	
3	16 56 26.34	+1.59	+44 53 36.7	−7.2	" " 10878	Seeing good; comet an easy object with 12-inch equatorial.
4	16 54 23.27	+1.62	+45 36 11.3	−7.1	" " 10847	Seeing good.
5	16 46 25.49	+1.67	+46 9 1.4	−6.8	½ (Madras 1875, 3772+Greenwich 1880, 2625)	Seeing fair; comet passed over a star of mag. 10; no diminution of brightness of star.
6	16 47 14.37	+1.70	+46 48 40.6	−6.6	Bonn, A. G. 10765	Seeing good.
7	16 46 47.90	+1.73	+47 16 21.7	−6.4	" " 10763	Seeing excellent.
8	16 36 41.92	+1.79	+47 53 51.0	−6.1	" " 10666	Seeing good.
9	16 40 0.67	+1.81	+48 35 10.4	−5.9	" " 10690	Seeing good.
10	16 11 45.94	+2.07	+52 12 25.1	−3.4	Camb., U. S., A. G. 4947	Seeing steady.
11	16 5 32.05	+2.09	+52 34 56.8	−3.0	" " " 4926	Seeing good; clouds interfered at first.

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COMET 1904 I—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
12	16 2 6.60	+2.11	+52 59 14.9	− 2.6	Camb., U. S., A. G. 4911	Seeing fair; clouds interfered.
13	15 57 10.60	+2.15	+53 25 21.2	− 2.2	" " " 4884	Seeing good; good observation.
14	16 0 52.32	+2.16	+53 41 58.4	− 2.0	" " " 4904	Seeing excellent.
15	15 52 59.88	+2.18	+54 18 31.0	− 1.5	" " " 4869	Seeing excellent; no diminution in brightness of comet.
16	15 40 13.24	+2.21	+54 50 21.4	− 0.6	½ (Camb., U. S., A. G. 4822+Hels.-Gotha, A. G. 8474.)	Seeing excellent; comet seemed brighter than on any previous night.
17	15 37 57.32	+2.23	+55 16 3.8	− 0.2	Hels.-Gotha, A. G. 8455	Seeing good.
18	15 30 57.10	+2.24	+55 37 16.3	+ 0.3	" " " 8408	Seeing unsteady; clouds; very poor observation.
19	15 30 4.48	+2.25	+55 54 19.9	+ 0.7	" " " 8402	Seeing good.
20	15 23 47.36	+2.25	+56 3 8.9	+ 1.2	" " " 8373	Seeing fair.
21	15 13 26.52	+2.24	+56 21 50.8	+ 1.8	" " " 8291	Seeing good; comet too far from comparison star for satisfactory observation.
22	15 19 47.78	+2.27	+56 51 14.2	+ 2.1	" " " 8338	Seeing good.
23	15 5 10.20	+2.23	+57 4 14.4	+ 3.1	" " " 8240	
24	15 2 57.72	+2.23	+57 29 1.4	+ 3.5	" " " 8227	Seeing unsteady.
25	14 48 10.35	+2.16	+57 48 16.8	+ 4.7	" " " 8149	Seeing unsteady.
26	14 45 12.33	+2.14	+57 44 30.4	+ 5.0	" " " 8117	Seeing fair.
27	14 33 34.90	+2.08	+57 58 29.7	+ 5.5	" " " 8050	Seeing good; comet faint on account of moonlight and haze
28	14 37 27.81	+2.10	+58 7 26.1	+ 5.7	" " " 8071	Seeing good; comet faint on account of moonlight.
29	14 25 45.86	+2.03	+58 10 54.4	+ 6.2	" " " 7988	Seeing good; comet very faint; moonlight and haze.
30	14 19 35.56	+1.97	+58 6 44.2	+ 7.0	" " " 7949	Comet very faint; poor observation.
31	13 44 0.44	+1.56	+57 44 8.9	+ 9.1	" " " 7709	Seeing good; comet too faint for good observation.
32	13 28 20.95	+1.34	+57 17 20.2	+ 9.9	" " " 7608	Seeing good; comet too faint to observe well.
33	13 12 23.09	+1.08	+56 20 29.2	+10.3	" " " 7503	Seeing good.
34	13 7 42.08	+1.02	+56 26 14.4	+10.3	" " " 7473	Seeing good; fair observation, though rather difficult.
35	12 55 31.94	+1.05	+54 49 4.2	+10.4	" " " 7398	Seeing good.
36	12 43 52.05	+0.49	+52 58 37.6	+ 9.9	Camb., U. S., A. G. 4147	Seeing quite poor.
37	12 16 19.14	−0.20	+46 2 52.3	+ 3.6	Bonn, A. G. 8460	
38	12 21 17.58	−0.31	+43 39 0.5	− 0.5	" " 8502	Seeing good at first; became poor.
39	12 18 28.64	−0.31	+43 15 11.6	− 2.4	" " 8479	Seeing good.
40	12 19 4.05	−0.32	+43 4 27.5	− 3.3	" " 8482	Seeing fair; moonlight; comet very faint; poor observation.
41	12 29 26.36	−0.19	+42 55 8.6	−10.9	" " 8564	Seeing rather poor.
42	12 29 26.36	−0.17	+42 55 8.6	−11.3	" " 8564	Seeing poor; diffuse.
43	12 29 26.36	−0.16	+42 55 8.6	−11.6	" " 8564	Seeing poor greater part of the time; observation only fair.
44	12 38 10.80	+0.15	+45 8 47.3	−19.1	" " 8630	Sky quite clear, and comet fairly bright, but seeing not very good.
45	12 40 37.21	−0.22	+45 57 54.5	−20.6	" " 8653	Seeing good.
46	10 47 20.97	+1.52	+64 3 23.0	−13.9	Hels.-Gotha, A. G. 6527	Seeing poor.
47	10 18 38.47	+1.90	+64 24 54.4	− 2.2	" " " 6336	Comet fairly bright.
48	9 35 6.78	+2.19	+64 25 42.3	− 5.9	" " " 6039	Seeing good; comet quite faint; fair observation.
49	9 27 23.09	+2.17	+64 7 21.7	− 5.0	" " " 5991	Observation difficult on account of faint star near comet.
50	8 23 19.19	+1.22	+60 13 51.2	+ 2.3	" " " 5566	
51	8 13 54.90	+0.99	+59 23 40.1	+ 2.9	" " " 5492	
52	8 8 33.95	+0.61	+57 23 27.3	+ 3.3	" " " 5447	
53	7 59 10.65	+0.12	+54 48 14.5	+ 3.0	Camb., U. S., A. G. 3032	
54	7 55 6.09	+0.07	+54 44 54.6	+ 2.9	" " " 3015	
55	8 2 52.61	−0.61	+48 39 13.6	− 0.5	Bonn, A. G. 6418	Comet exceedingly faint; visible at intervals only.

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COMET 1904 II.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 20	17 23 40	+0 50.79	− 1 42.4	16 22 47.75	+28 57 36.8	9.703$_n$	0.598	1	25, 5	Hd.	26-inch
20	17 36 28	−0 5.45	− 4 47.7	16 22 48.89	+28 57 49.2	9.696$_n$	0.578	2	23, 5	Hd.	" "
21	17 30 12	−1 43.64	+ 1 34.4	16 25 22.94	+29 26 12.3	9.701$_n$	0.582	3	5, 1	Hd.	" "
28	17 33 55	+0 43.46	− 5 49.0	16 44 19.39	+32 53 41.3	9.709$_n$	0.525	4	20, 4	Hd.	" "
1905											
Jan. 1	18 13 21	+0 6.94	− 2 1.9	16 55 57.05	+34 58 26.7	9.681$_n$	0.397	5	4, 2	Hd.	26-inch
7	17 58 21	−0 4.09	+ 8 22.1	17 14 19.80	+38 9 31.5	9.709$_n$	0.364	6	10, 10	Hd.	" "
8	17 54 27	−3 17.24	+ 1 39.0	17 17 31.54	+38 41 44.2	9.715$_n$	0.364	7	30, 6	Fn.	" "
14	18 4 0	+3 16.55	− 2 15.3	17 37 39.51	+41 57 35.3	9.723$_n$	0.241	8	20, 4	Hd.	" "
16	17 32 0	−2 16.90	− 8 42.2	17 44 37.58	+43 2 6.2	9.760$_n$	0.340	9	40, 8	Fn.	" "
Feb. 2	17 8 56	+0 13.16	+ 4 8.2	18 52 16.95	+51 50 11.3	9.850$_n$	0.259	10	4, 4	Fn.	" "
4	17 16 39	−1 49.23	+ 0 27.3	19 1 9.85	+52 46 52.2	9.855$_n$	0.196	11	40, 8	Fn.	" "
6	17 42 39	+0 7.16	− 5 5.1	19 10 21.04	+53 42 3.6	9.845$_n$	9.965	12	6, 12	Fn.	" "
10	16 19 19	+0 2.24	+ 1 5.5	19 28 49.46	+55 24 12.3	9.905$_n$	0.445	13	8, 8	R.	" "
Mar. 15	16 44 57	+0 20.23	+ 5 27.2	22 18 7.52	+63 57 23.8	0.018$_n$	0.382	14	4, 4	R.	" "
30	16 31 41	+1 2.18	−12 40.3	23 28 55.53	+65 0 5.9	0.032$_n$	0.476	15	8, 4	Fn.	" "
Apr. 9	15 59 12	−1 21.11	− 6 51.7	0 9 59.83	+65 10 53.2	0.022$_n$	0.590	16	8, 8	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	16 21 56.45	+0.51	+28 59 21.6	−2.4	Camb., Eng., A.G. 7647	A faint globular comet with well-defined nucleus.
2	16 22 53.84	+0.50	+29 2 39.2	−2.3	" " " 7654	
3	16 27 6.08	+0.50	+29 24 40.0	−2.1	" " " 7682	Clouds interrupt; comet exceedingly faint on account of moonlight and haze.
4	16 43 35.51	+0.42	+32 59 33.1	−2.8	Leiden, A.G. 5926	
5	16 55 51.91	−1.80	+35 0 25.6	+3.0	½ (Leiden, A.G. 6001 + Lund, A.G. 6965)	Observation made through rifts in clouds.
6	17 14 25.66	−1.77	+38 1 7.7	+1.7	Lund, A.G. 7077	
7	17 20 50.55	−1.77	+38 40 3.6	+1.6	" " 7114	
8	17 34 24.69	−1.73	+41 59 50.5	+0.1	Bonn, A.G. 11313	Comet becoming fainter.
9	17 46 56.22	−1.74	+43 10 48.3	+0.1	" " 11468	Seeing good.
10	18 52 5.49	−1.70	+51 46 5.4	−2.3	Camb., U.S., A.G. 5781	Comet exceedingly faint.
11	19 3 0.78	−1.70	+52 46 27.3	−2.4	" " " 5856	
12	19 10 15.58	−1.70	+53 47 11.4	−2.7	" " " 5914	
13	19 28 48.90	−1.68	+55 23 9.7	−2.9	Hels.-Gotha, A.G. 10546	Seeing good; comet very faint; good observation.
14	22 17 48.80	−1.51	+63 52 1.0	−4.4	Micrometer comparison with— Hels.-Gotha, A.G. 13106 {$\Delta\alpha = -1^m 20^s.20$ ... $\Delta\delta = +3'\ 11''.1$ ...}	Seeing good; comet extremely faint; poor observation.
15	23 27 54.75	−1.40	+65 12 51.8	−5.6	Hels.-Gotha, A.G. 14140	Comet exceedingly faint; daylight approaching.
16	0 11 22.23	−1.29	+65 17 51.6	−6.7	½ (Christiania, A.G. 39 + Hels.-Gotha, A.G. 164)	Comet exceedingly faint.

COMET 1905 II.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1904	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 30	10 44 58	−0 37.23	−1 52.7	1 15 14.19	−8 56 48.4	9.610	0.774	1	30, 6	Hd.	26-inch
31	7 54 20	+2 12.36	−1 2.0	1 16 22.35	−8 13 30.1	9.188	0.804	2	30, 6	Hd.	" "

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COMET 1905 II—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 1	7 12 44	+1 24.62	+ 1 41.1	1 17 38.71	− 7 25 45.1	8.892	0.801	3	25, 5	Hd.	26-inch
1	7 27 16	−1 54.19	− 0 29.2	1 17 39.56	− 7 25 15.6	9.028	0.800	4	25, 5	Hd.	" "
2	7 3 6	+2 28.61	+ 2 29.8	1 18 58.62	− 6 37 1.8	8.806	0.795	5	30, 6	Hd.	" "
4	6 49 33	−1 16.73	− 1 53.8	1 21 44.07	− 4 59 41.6	8.671	0.784	6	30, 6	Hd.	" "
8	7 12 36	−5 21.97	+ 2 30.1	1 27 39.01	− 1 44 54.3	9.047	0.756	7	20, 4	Hd.	" "
20	7 13 18	+0 56.12	− 0 12.0	1 47 55.03	+ 7 35 29.8	9.219	0.663	8	20, 4	Hd.	" "
26	7 11 21	+1 26.56	+ 5 25.2	1 59 26.71	+11 58 42.7	9.272	0.610	9	20, 4	Hd.	" "
27	7 7 29	+0 51.99	+ 3 7.8	2 1 27.47	+12 41 9.9	9.264	0.600	10	25, 5	Hd.	" "
28	7 17 34	−2 13.06	+ 9 33.6	2 3 29.86	+13 23 43.2	9.316	0.594	11	24, 5	Hd.	" "
30	7 2 6	−0 14.51	− 3 35.2	2 7 37.49	+14 46 25.1	9.270	0.569	12	12, 12	Hd.	" "
Feb. 2	7 16 11	+2 13.61	− 3 56.1	2 14 3.99	+16 48 31.9	9.351	0.546	13	25, 5	Hd.	" "
4	7 24 56	+2 38.41	− 1 7.1	2 18 29.15	+18 7 43.5	9.395	0.531	14	25, 5	Hd.	" "
7	7 8 40	+2 46.69	− 2 9.9	2 25 15.72	+20 2 38.7	9.363	0.491	15	20, 4	Hd.	" "
10	7 18 58	+5 19.44	− 0 35.9	2 32 18.77	+21 54 10.4	9.418	0.468	16	14, 2	Hd.	" "
14	7 11 26	−0 14.09	− 1 52.4	2 42 2.37	+24 16 1.3	9.421	0.417	17	8, 8	Hd.	" "
24	7 24 30	+2 0.13	+10 32.1	3 8 12.51	+29 38 51.5	9.513	0.326	18	6, 6	Hd.	" "
26	7 30 43	+1 11.15	− 3 24.5	3 13 45.44	+30 37 50.8	9.537	0.316	19	34, 7	Hd.	" "
Mar. 2	7 14 20	+2 51.73	+ 0 37.1	3 25 6.42	+32 29 26.3	9.518	0.234	20	24, 5	Hd.	" "
25	7 42 29	+0 28.35	+ 6 58.9	4 38 6.40	+40 43 26.3	9.658	0.089	21	10, 10	Hd.	" "
28	8 29 52	+0 29.25	− 6 47.4	4 48 32.55	+41 29 26.8	9.728	0.284	22	8, 8	Hd.	" "
29	8 4 37	−1 4.58	− 0 12.5	4 51 57.45	+41 43 24.9	9.700	0.171	23	25, 5	Hd.	" "
30	9 11 56	+0 55.85	+ 5 56.4	4 55 36.37	+41 57 47.1	9.767	0.425	24	25, 5	Hd.	" "
31	8 20 6	+0 30.02	− 0 11.5	4 58 58.92	+42 10 31.8	9.123	0.232	25	8, 8	Hd.	" "
Apr. 2	8 26 34	+0 10.12	− 7 9.5	5 6 2.67	+42 35 45.1	9.734	0.252	26	8, 8	Hd.	" "
8	9 58 45	+1 53.74	+ 1 38.2	5 27 41.30	+43 40 26.6	9.799	0.546	27	25, 5	Hd.	" "
22	8 49 11	+0 41.16	− 6 12.4	6 18 14.80	+45 6 43.9	9.779	0.317	28	8, 8	Hd.	" "
23	8 27 8	−0 24.90	+12 31.7	6 21 48.40	+45 9 41.9	9.761	0.218	29	8, 8	Hd.	" "
May 1	9 19 18	−0 2.35	+ 6 29.8	6 50 38.58	+45 19 33.0	9.801	0.436	30	10, 12	Hd.	" "
2	9 35 48	−2 57.48	+ 7 0.4	6 54 14.25	+45 19 9.7	9.807	0.489	31	10, 9	Hd.	" "
21	8 57 10	+1 26.93	+ 2 49.9	7 58 46.38	+44 9 6.0	9.786	0.415	32	8, 6	Hd.	" "
23	9 13 53	+0 19.27	+14 29.1	8 5 14.26	+43 55 46.4	9.793	0.475	33	6, 8	Hd.	" "
24	10 0 24	−2 38.88	+ 0 57.0	8 8 31.04	+43 48 30.7	9.802	0.599	34	8, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	1 15 48.56	+2.86	− 8 55 5.3	+9.6	Wien-Ottakring, A. G. 271	Seeing very poor.
2	1 14 7.13	+2.86	− 8 12 38.0	+9.9	" " " 263	Seeing very bad.
3	1 16 14.24	−0.15	− 7 27 17.2	−9.0	" " " 272	Seeing excellent.
4	1 19 33.87	−0.12	− 7 24 37.2	−9.2	" " " 248	
5	1 16 30.16	−0.15	− 6 39 22.8	−8.8	" " " 274	
6	1 23 0.92	−0.12	− 4 57 39.2	−8.6	Straszburg, A. G. 331	
7	1 33 1.06	−0.08	− 1 47 16.4	−8.0	Nicolajew, A. G. 317	
8	1 46 58.98	−0.07	+ 7 35 47.9	−6.1	Leipzig II, A. G. 704	Comet extremely faint on account of bright moonlight; observation poor.
9	1 58 0.21	−0.06	+11 53 22.9	−5.4	Leipzig I, A. G. 612	Seeing bad; comet fairly bright.
10	2 0 35.53	−0.05	+12 38 7.3	−5.2	" " " 622	
11	2 5 42.95	−0.03	+13 14 14.9	−5.3	" " " 644	Star double; n. fol. component observed but mean given in Cat.; corr. of $+0^s.17$ in α and $+1''.2$ in δ applied to mean.
12	2 7 52.03	−0.03	+14 50 5.2	−4.9	" " " 654	Seeing poor.
13	2 11 50.42	−0.04	+16 52 32.4	−4.4	Berlin A, A. G. 634	Comet faint on account of clouds.
14	2 15 50.78	−0.04	+18 8 54.8	−4.2	" " " 648	
15	2 22 29.07	−0.04	+20 4 52.5	−3.9	" " " 677	Comet growing fainter rapidly.
16	2 26 59.38	−0.05	+21 54 50.0	−3.7	Berlin B, A. G. 768	Comet extremely faint because of moonlight.
17	2 42 16.48	−0.02	+24 17 57.3	−3.6	" " " 834	Comet very faint on account of moonlight.
18	3 6 12.42	−0.04	+29 28 22.3	−2.9	Çamb., Eng., A. G. 1598	

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COMET 1905 II—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
19	3 12 34.33	−0.04	+30 41 18.1	−2.8	Leiden, A. G. 1245	Comet growing fainter rapidly.
20	3 22 14.75	−0.06	+32 28 51.7	−2.5	" " 1318	
21	4 37 38.20	−0.15	+40 36 29.4	−2.0	Bonn, A. G. 3797	
22	4 48 3.46	−0.16	+41 36 16.1	−1.9	" " 3940	
23	4 53 2.19	−0.16	+41 43 39.3	−1.9	" " 4011	
24	4 54 40.70	−0.18	+41 51 52.6	−1.9	" " 4040	Comet exceedingly faint.
25	4 58 29.08	−0.18	+42 10 45.1	−1.8	" " 4103	
26	5 5 52.75	−0.20	+42 42 56.3	−1.7	" " 4216	
27	5 25 47.80	−0.24	+43 38 50.2	−1.8	" " 4521	The δ of comparison star is one minute wrong as published in the Cat.
28	6 17 33.95	−0.31	+45 12 57.9	−1.6	" " 5214	
29	6 22 13.60	−0.30	+44 57 11.8	−1.6	" " 5269	
30	6 50 41.27	−0 34	+45 13 4.5	−1.3	" " 5632	
31	6 57 12.06	−0.33	+45 12 10.5	−1.2	" " 5717	
32	7 57 19.82	−0.37	+44 6 17.1	−1.0	" " 6366	Comet barely visible.
33	8 4 55.35	−0.36	+43 41 18.2	−0.9	" " 6436	
34	8 11 10.27	−0.35	+43 47 34.4	−0.7	" " 6497	

COMET 1905 III.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. Δα	COMET–STAR. Δδ	COMET'S APPARENT α	COMET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 28	7 48 18	−0 10.84	− 2 4.3	5 52 0.24	+13 39 30.0	9.429	0.604	1	8, 8	Hd.	26-inch
29	7 36 46	+0 20.64	− 4 45.6	5 55 36.15	+14 52 12.7	9.399	0.582	2	8, 8	Hd.	" "
30	8 16 48	−0 18.45	− 6 36.5	5 59 24.06	+16 7 28.2	9.504	0.588	3	8, 8	Hd.	" "
31	7 46 44	−0 6.59	− 5 50.4	6 3 6.30	+17 18 57.8	9.435	0.553	4	8, 8	Hd.	" "
Apr. 1	8 44 12	−0 51.64	− 7 34.8	6 7 6.72	+18 34 34.6	9.561	0.577	5	20, 4	Hd.	" "
2	7 46 0	+0 13.71	+ 6 9.4	6 10 53.89	+19 44 2.2	9.439	0.514	6	8, 8	Hd.	" "
3	8 39 41	−1 39.47	+ 3 22.5	6 15 3.52	+20 58 33.1	9.560	0.543	7	20, 4	Hd.	" "
7	8 50 27	−1 32.82	+ 2 30.6	6 32 0.12	+25 39 29.8	9.591	0.486	8	25, 5	Hd.	" "
8	9 9 56	+1 22.01	+ 2 10.5	6 36 29.69	+26 48 19.7	9.623	0.496	9	30, 6	Hd.	" "
22	8 4 26	+3 13.12	+11 48.9	7 47 0.30	+40 12 22.1	9.533	9.751	10	25, 5	Hd.	" "
23	9 10 48	−0 55.98	− 3 44.1	7 52 52.86	+40 59 22.6	9.672	0.119	11	25, 5	Hd.	" "
24	9 6 20	+3 29.90	+ 3 17.8	7 58 33.40	+41 42 21.3	9.667	0.055	12	18, 4	Hd.	" "
May 1	8 25 4	+2 13.63	+ 2 0.7	8 39 37.95	+45 49 48.1	9.582	9.213_n	13	10, 10	Hd.	" "
2	8 43 35	+0 50.85	+ 0 48.0	8 45 44.46	+46 18 7.5	9.626	8.053_n	14	9, 10	Hd.	" "
21	9 36 12	−0 9.56	− 1 39.9	10 38 9.33	+49 53 45.4	9.689	9.409_n	15	6, 8	Hd.	" "
23	10 31 37	+0 47.57	+ 2 44.6	10 49 7.00	+49 47 34.2	9.772	9.829	16	6, 8	Hd.	" "
June 1	10 29 18	−1 41.94	−11 58.9	11 33 36.39	+48 33 55.2	9.746	9.784	17	6, 8	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	5 52 10.96	+0.12	+13 41 45.8	−11.5	Leipzig I, A. G. 1908	
2	5 55 15.39	+0.12	+14 57 9.4	−11.1	" " " 1935	
3	5 59 42.38	+0.13	+16 14 15.3	−10.6	Berlin A, A. G. 1890	
4	6 3 12.76	+0.13	+17 24 58.4	−10.2	" " " 1931	
5	6 7 58.23	+0.13	+18 42 19.1	− 9.7	" " " 1994	
6	6 10 40.05	+0.13	+19 38 2.2	− 9.4	" " " 2032	

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COMET 1905 III—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
7	6 16 42.85	+0.14	+20 55 19.5	−8.9	Berlin B, A. G. 2334	Sky thick; very unsatisfactory observation because comet was too faint for transits.
8	6 33 32.80	+0.14	+25 37 6.5	−7.3	Camb., Eng., A. G. 3395	
9	6 35 7.55	+0.13	+26 46 16.1	−6.9	" " " 3422	
10	7 43 47.03	+0.15	+40 0 35.0	−1.8	½ (Bonn, A. G. 6238+Lund, A. G. 3995)	
11	7 53 48.67	+0.17	+41 3 8.1	−1.4	Bonn, A. G. 6334	
12	7 55 3.35	+0.15	+41 39 4.6	−1.1	" " 6344	
13	8 37 24.13	+0.19	+45 47 46.3	+1.1	" " 6747	
14	8 44 53.40	+0.21	+46 17 18.1	+1.4	" " 6809	
15	10 38 18.49	+0.40	+49 55 19.9	+5.4	½ (Bonn, A. G. 7731+Camb., U. S., A. G. 3701)	Comet exceedingly faint.
16	10 48 19.00	+0.43	+49 44 43.9	+5.7	½ (Bonn, A. G. 7799+Camb., U. S., A. G. 3739)	
17	11 35 17.78	+0.55	+48 45 46.8	+7.3	Bonn, A. G. 8150	Comet extremely faint; star given as B. D. +48° 2076 in Bonn, A. G., should be B. D. +49° 2076.

COMET 1905 IV.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 5	12 29 6	−2 14.88	−3 27.3	11 35 1.88	+1 42 36.3	8.438_n	0.724	1	25, 5	Fn.	26-inch
6	11 42 38	−2 39.70	−2 4.6	11 34 37.06	+1 43 58.9	9.044_n	0.724	2	10, 2	Fn.	" "
17	14 37 24	−0 8.70	−0 6.5	11 29 48.38	+2 0 42.6	9.485	0.725	3	30, 6	Fn.	" "
20	12 27 26	−1 21.72	+4 12.8	11 28 35.37	+2 5 1.8	8.997	0.720	4	25, 5	Fn.	" "
21	12 31 1	−1 46.46	+5 41.8	11 28 10.63	+2 6 30.8	9.060	0.720	5	25, 5	Fn.	" "
22	13 45 14	−2 11.97	+7 12.2	11 27 45.12	+2 8 1.2	9.410	0.723	6	25, 5	Fn.	" "
31	13 44 41	+0 34.26	−3 41.9	11 24 26.11	+2 19 28.7	9.500	0.724	7	25, 5	Fn.	" "
Apr. 1	11 42 17	+0 16.40	−2 43.1	11 24 8.25	+2 20 27.5	9.049	0.718	8	25, 5	Fn.	" "
3	12 17 27	−0 21.08	−0 41.1	11 23 30.76	+2 22 29.5	9.288	0.719	9	25, 5	Fn.	" "
12	10 8 29	+1 41.72	+2 33.9	11 21 18.99	+2 28 30.1	8.244	0.716	10	25, 5	Fn.	" "
13	12 4 0	+1 10.46	−7 45.4	11 21 7.03	+2 28 51.9	9.387	0.720	11	25, 5	Fn.	" "
16	12 25 16	+1 1.23	+3 34.1	11 20 38.48	+2 29 30.3	9.474	0.722	12	25, 5	Fn.	" "
17	10 34 17	−0 29.15	+6 18.8	11 20 31.37	+2 29 33.8	9.038	0.716	13	25, 5	Fn.	" "
27	11 3 1	−1 0.54	+2 47.1	11 19 59.90	+2 26 2.6	9.372	0.720	14	25, 5	Fn.	" "
May 19	10 58 19	+1 9.50	+1 8.0	11 23 54.73	+1 50 8.6	9.548	0.729	15	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	11 37 15.64	+1.12	+1 46 11.5	−7.9	Albany, A. G. 4335	The reading of the micrometer changed by 1 rev.
2	11 37 15.64	+1.12	+1 46 11.5	−8.0	" " 4335	
3	11 29 55.89	+1.19	+2 0 57.8	−8.7	" " 4308	
4	11 29 55.89	+1.20	+2 0 57.8	−8.8	" " 4308	
5	11 29 55.89	+1.20	+2 0 57.8	−8.8	" " 4308	
6	11 29 55.89	+1.20	+2 0 57.8	−8.8	" " 4308	
7	11 23 50.67	+1.18	+2 23 19.5	−8.9	" " 4288	
8	11 23 50.67	+1.18	+2 23 19.5	−8.9	" " 4288	
9	11 23 50.67	+1.17	+2 23 19.5	−8.9	" " 4288	
10	11 19 36.15	+1.12	+2 26 5.0	−8.8	" " 4264	
11	11 19 55.45	+1.12	+2 36 46.1	−8.8	" " 4265	

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COMET 1905 IV—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
12	11 19 36.15	+1.10	+2 26 5.0	−8.8	Albany, A. G. 4264	Comet fairly bright; has a nucleus.
13	11 20 59.43	+1.09	+2 23 23.7	−8.7	" " 4271	
14	11 20 59.43	+1.01	+2 23 23.7	−8.2	" " 4271	
15	11 22 44.42	+0.81	+1 49 7.7	−7.1	" " 4281	

COMET 1905 V.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 21	6 14 46	−3 51.22	− 5 12.0	23 46 14.76	+52 53 28.7	9.464_n	0.238_n	1	15, 3	Hd.	26-inch
21	11 52 1	−0 50.41	−12 52.9	23 44 50.44	+50 53 17.0	9.807	9.998	2	8, 6	R.	12-inch.
22	12 24 31	+0 44.84	− 1 58.6	23 40 23.95	+42 35 19.4	9.772	0.424	3	6, 10	R.	" "
23	10 39 34	−1 54.42	− 0 20.2	23 37 39.64	+35 48 47.0	9.622	0.248	4	30, 6	R.	" "
25	9 58 45	+2 49.84	− 3 35.1	23 34 3.10	+23 58 56.4	9.512	0.463	5	25, 5	R.	" "
26	9 56 19	−2 35.59	+ 1 58.9	23 32 54.64	+19 13 36.7	9.504	0.543	6	20, 5	R.	" "
29	10 42 54	+4 57.63	− 0 48.4	23 30 55.31	+ 8 36 28.0	9.585	0.687	7	20, 4	R.	" "
30	7 16 37	−0 49.19	+ 2 53.6	23 30 38.16	+ 6 23 22.0	8.659	0.672	8	35, 7	R.	" "
Dec. 1	8 41 18	+1 47.18	− 7 33.4	23 30 21.91	+ 3 59 38.7	9.336	0.704	9	20, 4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	23 50 2.31	+3.67	+52 58 10.1	+30.6	Camb., U. S., A. G. 8526	Comet quite bright, with well defined nucleus; large and globular.
2	23 45 37.33	+3.52	+51 5 39.3	+30.6	" " " 8491	Seeing fair.
3	23 39 35.95	+3.16	+42 36 48.4	+29.6	Bonn, A. G. 18101	Seeing fair.
4	23 39 31.07	+2.99	+35 48 39.0	+28.2	Lund, A. G. 11309	Seeing good.
5	23 31 10.54	+2.72	+24 2 5.9	+25.6	Berlin B, A. G. 9036	Seeing good.
6	23 35 27.55	+2.68	+19 11 13.7	+24.1	Berlin A, A. G. 9651	Seeing fair; clouds interfere: fair observation.
7	23 25 55.20	+2.48	+ 8 36 55.4	+21.0	Leipzig II, A. G. 11668	Seeing rather poor; unsteady.
8	23 31 24.87	+2.48	+ 6 20 8.3	+20.1	" " " 11701	Seeing fair; comet somewhat faint on account of moonlight.
9	23 28 32.29	+2.44	+ 4 6 52.7	+19.4	Albany, A. G. 8102	Seeing fair; comet very faint on account of moonlight; clouds interfere.

COMET 1905 VI.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. $\Delta\alpha$	COMET–STAR. $\Delta\delta$	COMET'S APPARENT α	COMET'S APPARENT δ	LOG $p\Delta$. α	LOG $p\Delta$. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 29	15 21 17	−1 2.81	+5 15.9	16 17 5.76	+52 8 29.6	9.830_n	0.046	1	18, 6	R.	12-inch

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COMET 1905 VI—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $\rho\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Jan. 31	16 24 13	+2 43.94	−1 38.9	16 14 33.25	+55 46 31.9	9.773$_n$	9.892$_n$	2	23, 5	R.	12-inch
Feb. 1	15 53 50	+1 53.22	+1 34.3	16 12 59.52	+57 35 12.4	9.834$_n$	9.719$_n$	3	23, 5	R.	" "
3	16 9 38	−1 20.84	+0 22.2	16 8 48.10	+61 26 31.7	9.839$_n$	0.188$_n$	4	21, 7	R.	" "
13	9 28 11	+1 17.62	−0 0.6	14 35 20.47	+80 58 25.0	0.427$_n$	0.553	5	12, 4	R.	" "
15	10 44 1	−8 53.04	−4 30.1	12 55 41.58	+84 3 26.2	0.611$_n$	0.305$_n$	6	15, 3	R.	" "
23	10 45 5	+1 53.58	−2 27.8	6 24 52.94	+76 0 0.1	0.067	0.591$_n$	7	20, 4	R.	26-inch
24	11 7 4	−8 14.67	−4 35.5	6 15 38.71	+74 17 28.0	0.091	0.479$_n$	8	20, 4	R.	" "
Apr. 16	8 39 48	−0 41.8	−1 19.	5 55 6.8	+33 15 6.	9.697	0.483	9	4, 4	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	16 18 9.99	−1.42	+52 3 23.2	− 9.5	Camb., U. S., A. G. 4970	Seeing good.
2	16 11 50.71	−1.40	+55 48 21.3	−10.5	Hels.-Gotha, A. G. 8708	Seeing excellent.
3	16 11 7.71	−1.41	+57 33 49.0	−10.9	" " " 8703	Seeing fairly good at times; high wind shakes instrument.
4	16 10 10.39	−1.45	+61 26 21.0	−11.5	" " " 8698	Seeing good.
5	14 34 3.00	−0.15	+80 58 39.7	−14.1	Greenwich Second Nine Year Cat	Seeing steady; sky became thick.
6	13 4 31.12	+3.50	+84 8 8.7	−12.4	" " " " "	Seeing good.
7	6 22 57.10	+2.26	+76 2 20.7	+ 7.2	Kasan, A. G. 1137	Seeing good.
8	6 23 51.42	+1.96	+74 21 56.5	+ 7.0	Greenwich Second Nine Year Cat	Seeing fair; comet rather faint; sky thick.
9	5 55 49.21	−0.59	+33 16 28.4	− 3.4	Leiden, A. G. 2405	Approximate position from eye and ear measure.

COMET 1906 I.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $\rho\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1905	h m s	m s	′ ″	h m s	° ′ ″						
Dec. 7	17 20 12	−0 56.39	− 7 44.1	14 27 34.03	+20 26 23.3	9.627$_n$	0.598	1	20, 4	D.	26-inch
11	17 27 51	−1 36.12	− 7 8.5	14 47 24.11	+18 30 12.5	9.618$_n$	0.614	2	25, 4	D.	" "
1906											
Jan. 6	17 55 1	+0 55.57	+ 5 26.0	17 36 7.08	− 3 23 34.9	9.632$_n$	0.751	3	25, 5	Hd.	26-inch
9	18 40 47	+2 47.84	− 7 0.8	18 0 40.67	− 7 1 33.4	9.605$_n$	0.768	4	20, 4	Fn.	" "
Feb. 15	7 11 27	+3 21.99	− 7 56.8	0 29 3.39	−15 46 44.0	9.636	0.782	5	25, 5	Fn.	12-inch
16	6 56 51	+1 0.18	−11 4.7	0 36 5.20	−15 0 11.3	9.618	0.790	6	25, 5	Fn.	26-inch
17	6 56 57	+0 58.09	+ 3 11.0	0 42 56.37	−14 13 32.1	9.613	0.789	7	25, 5	Fn.	" "
24	7 12 51	+2 42.63	+ 0 44.5	1 24 46.81	− 9 4 1.7	9.607	0.775	8	25, 5	Fn.	" "
26	7 11 58	+0 33.33	+ 2 20.3	1 35 0.77	− 7 43 11.7	9.602	0.771	9	20, 4	Fn.	" "
Mar. 22	7 56 16	−2 15.22	+ 1 2.1	3 2 27.07	+ 4 2 21.5	9.642	0.728	10	25, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	14 28 29.71	+0.71	+20 34 16.7	−9.3	Berlin B, A. G. 5096	

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COMET 1906 I—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
2	14 48 59.46	+0.77	+18 37 29.1	− 8.1	Berlin A, A. G. 5382	
3	17 35 13.34	−1.83	− 3 29 7.3	+ 6.4	Warsaw 4167	Comet very bright, with well-defined nucleus and tail 30′ long.
4	17 57 54.67	−1.84	− 6 54 38.6	+ 6.0	Wien-Ottakring, A. G. 6072	
5	0 25 42.73	−1.33	−15 38 34.9	−12.3	Washington, A. G. 136	
6	0 35 6.31	−1.29	−14 48 54.1	−12.5	" " 171	
7	0 41 59.54	−1.26	−14 16 30.5	−12.6	" " 196	
8	1 22 5.28	−1.10	− 9 4 33.4	−12.8	Wien-Ottakring, A. G. 294	Seeing bad.
9	1 34 28.50	−1.06	− 7 45 19.1	−12.9	" " " 338	Thick haze; poor observation.
10	3 4 43.19	−0.90	+ 4 1 31.2	−11.8	Albany, A. G. 908	

COMET 1906 II.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. Δα	COMET–STAR. Δδ	COMET'S APPARENT α	COMET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 20	7 17 39	−1 5.35	+ 1 21.5	2 12 36.00	−4 44 58.5	9.644	0.751	1	15,3	Hd.	26-inch
21	7 21 42	−3 49.92	− 7 51.4	2 15 47.24	−3 39 38.9	9.646	0.748	2	20,4	Hd.	" "
22	7 22 16	−1 13.49	− 3 37.5	2 18 52.53	−2 36 3.5	9.646	0.746	3	20,4	Hd.	" "
23	7 26 27	−0 40.63	− 6 50.6	2 21 53.36	−1 33 50.1	9.648	0.743	4	25,5	Hd.	" "
Apr. 2	7 44 33	−1 0.01	+14 17.2	2 48 19.65	+7 31 57.3	9.662	0.730	5	9,2	Hd.	" "
3	7 51 55	+1 2.27	− 3 29.2	2 50 41.52	+8 19 48.2	9.664	0.731	6	8,2	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	2 13 42.45	−1.10	−4 46 7.4	−12.6	Warsaw, 378	Comet faint and diffuse; poor observation.
2	2 19 38.24	−1.08	−3 31 35.0	−12.5	" 389	
3	2 20 7.10	−1.08	−2 32 13.7	−12.3	½ (Pulkowa 1875, 584+585)	Seeing very bad; comparison star double; the mean was used.
4	2 22 35.07	−1.08	−1 26 47.4	−12.1	Nicolajew, A. G. 491	Comet very faint; very poor observation.
5	2 49 20.70	−1.04	+7 17 51.0	−10.9	Leipzig II, A. G. 1072	
6	2 49 40.29	−1.04	+8 23 28.1	−10.7	" " " 1076	

COMET 1906 IV.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR. Δα	COMET–STAR. Δδ	COMET'S APPARENT α	COMET'S APPARENT δ	LOG pΔ. α	LOG pΔ. δ	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1906	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 5	8 29 50	+4 41.24	+2 1.1	22 39 3.49	+9 29 34.5	9.538_n	0.669	1	4,4	Fn.	26-inch
7	8 51 21	+3 26.98	+0 43.5	22 37 37.59	+9 18 12.3	9.477_n	0.661	2	25,5	Fn.	" "
8	8 31 4	−2 30.18	+2 37.3	22 36 56.48	+9 12 17.0	9.510_n	0.667	3	25,5	Fn.	" "

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COMET 1906 IV—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Sept. 9	8 48 1	+0 49.97	+0 34.7	22 36 15.50	+9 6 13.9	9.463$_n$	0.661	4	20, 4	Fn.	26-inch
12	12 53 26	+0 24.81	−0 28.1	22 34 12.46	+8 46 1.0	9.309	0.653	5	21, 7	R.	" "
21	9 11 9	−1 56.51	−2 24.2	22 29 33.65	+7 45 3.3	9.189$_n$	0.660	6	30, 6	R.	" "
24	11 13 50	+1 14.41	+4 24.3	22 28 22.39	+7 23 13.7	9.061	0.663	7	29, 6	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	22 34 19.65	+2.60	+9 27 15.7	+17.7	Leipzig II, A. G. 11342	
2	22 34 8.01	+2.60	+9 17 10.9	+17.9	" " " 11338	
3	22 39 24.05	+2.61	+9 9 21.8	+17.9	" " " 11375	
4	22 35 22.92	+2.61	+9 5 21.1	+18.1	" " " 11351	
5	22 33 45.04	+2.61	+8 46 10.5	+18.6	" " " 11334	Sky clear; seeing good; comet very faint; poor observation.
6	22 31 27.58	+2.58	+7 47 8.3	+19.2	" " " 11320	Seeing good; good observation, though comet was faint.
7	22 27 5.42	+2.56	+7 18 29.8	+19.6	" " " 11298	Seeing poor; unsteady; comet faint; observation only fair.

COMET FINLAY.

[1906 V.]

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
July 19	13 41 37	+1 15.22	− 0 52.7	23 59 48.57	−12 28 41.3	9.454$_n$	0.816	1	30, 6	Hd.	26-inch
21	13 28 3	+0 1.29	+ 4 47.6	0 14 3.04	−11 23 13.9	9.497$_n$	0.806	2	8, 8	Hd	" "
24	14 4 16	+1 47.57	− 3 18.0	0 37 13.76	− 9 30 11.4	9.437$_n$	0.802	3	25, 5	Hd.	" "
30	15 8 54	+5 21.40	+ 0 48.1	1 28 26.67	− 4 56 21.7	9.316$_n$	0.778	4	10, 2	Hd.	" "
Aug. 15	15 39 31	−2 40.29	−11 38.3	3 51 1.73	+ 8 33 49.5	9.464$_n$	0.667	5	15, 3	Hd.	" "
23	16 3 6	−1 29.55	− 2 22.7	4 49 36.55	+13 19 35.0	9.455$_n$	0.612	6	15, 3	Hd.	" "
Sept. 20	14 10 29	+2 46.65	+ 6 23.0	6 58 23.24	+19 51 0.4	9.666$_n$	0.651	7	20, 4	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	23 58 31.91	+1.44	−12 28 2.4	+13.8	Camb., U. S., A. G. Zones	Comet very faint; about 30″ in diameter.
2	0 14 0.34	+1.41	−11 28 15.0	+13.5	Radcliffe 1890, 57	
3	0 35 24.80	+1.39	− 9 27 6.2	+12.8	Wien-Ottakring, A. G. 133	Comet very difficult; star double; used s. fol. component.
4	1 23 3.95	+1.32	− 4 57 20.5	+10.7	Straszburg, A. G. 331	Comet much brighter.
5	3 53 40.94	+1.08	+ 8 45 25.4	+ 2.4	Leipzig II, A. G. 1466	
6	4 51 5.06	+1.04	+13 21 58.2	− 0.5	Boss's Preliminary General Cat. 1169	
7	6 55 35.41	+1.18	+19 44 43.0	− 5.6	Berlin A, A. G. 2534	Comet rather bright but diffuse.

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COMET 1906 VI.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 16	11 37 58	−2 3.09	−2 59.3	4 4 11.35	−2 46 55.4	8.950$_n$	0.765	1	25, 5	Hd.	26-inch
21	9 20 57	−2 9.65	+2 4.4	4 3 0.64	−3 47 5.7	9.472$_n$	0.766	2	25, 5	Hd.	" "
22	12 56 58	+2 32.67	−6 34.8	4 2 42.80	−3 59 14.8	9.070	0.774	3	25, 5	Fn.	" "
23	13 14 52	−0 54.28	+5 57.5	4 2 27.28	−4 9 22.4	9.204	0.774	4	20, 4	Hd.	" "
24	12 46 40	+1 37.60	+3 15.2	4 2 12.51	−4 18 35.2	9.056	0.777	5	25, 5	Fn.	" "
Dec. 4	7 49 31	−1 12.70	+4 28.3	4 0 4.11	−5 20 45.4	9.544$_n$	0.770	6	15, 5	Fn.	" "
11	10 34 2	+1 9.38	−6 44.1	3 59 16.83	−5 33 4.4	8.044$_n$	0.788	7	20, 5	Fn.	" "
1907											
Jan. 5	7 20 49	+0 30.37	−0 7.7	4 5 36.25	−3 32 39.5	9.314$_n$	0.768	8	20, 4	Fn.	26-inch
10	9 37 53	+0 54.62	−2 19.4	4 8 46.75	−2 47 44.2	8.969	0.765	9	20, 5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	4 6 11.41	+3.03	−2 44 1.4	+ 5.3	Warsaw 694	
2	4 5 7.22	+3.07	−3 49 15.0	+ 4.9	" 691	
3	4 0 7.05	+3.08	−3 52 45.1	+ 5.1	Straszburg, A. G. 1018	
4	4 3 18.47	+3.09	−4 15 24.7	+ 4.8	" " 1036	Comet very faint.
5	4 0 31.81	+3.10	−4 21 55.2	+ 4.8	" " 1024	Comet very faint on account of moonlight.
6	4 1 13.65	+3.16	−5 25 17.0	+ 3.3	" " 1027	
7	3 58 4.27	+3.18	−5 26 22.8	+ 2.5	" " 1006	
8	4 5 5.68	+0.20	−3 32 21.6	−10.2	" " 1046	Comet exceedingly faint.
9	4 7 51.95	+0.18	−2 45 14.1	−10.7	" " 1063	

COMET 1906 VII.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1906	h m s	m s	′ ″	h m s	° ′ ″						
Nov. 12	15 15 0	+3 52.28	+10 7.4	9 25 33.08	+15 4 4.0	9.493$_n$	0.598	1	15, 3	Hd.	26-inch
13	14 11 10	+1 55.83	+ 5 47.5	9 29 53.68	+16 15 5.4	9.602$_n$	0.627	2	25, 5	Fn.	" "
15	16 27 46	−0 53.07	−10 56.2	9 39 47.36	+18 55 50.5	9.284$_n$	0.500	3	22, 5	R.	12-inch
22	14 10 20	+0 53.84	+ 9 40.4	10 16 41.72	+28 21 38.3	9.654$_n$	0.508	4	17, 6	R.	" "
23	15 6 53	−1 37.55	−10 6.7	10 22 52.45	+29 49 7.9	9.583$_n$	0.385	5	12, 4	R.	" "
24	14 0 13	+1 58.95	− 5 22.2	10 28 42.46	+31 9 18.8	9.680$_n$	0.497	6	21, 5	R.	" "
24	14 26 42	+0 55.33	− 3 16.1	10 28 49.09	+31 10 56.1	9.652$_n$	0.444	7	25, 5	R.	" "
25	14 59 30	−2 16.83	+ 3 24.2	10 35 14.25	+32 36 36.0	9.616$_n$	0.350	8	22, 5	R.	" "
28	15 57 24	−2 5.92	− 3 28.2	10 55 21.29	+36 46 41.2	9.537$_n$	0.054	9	20, 5	R.	" "
29	15 57 18	−3 57.86	− 5 36.1	11 2 18.44	+38 6 31.3	9.553$_n$	9.995	10	21, 5	R.	" "
Dec. 11	14 43 43	−0 32.23	.. ....	12 36 27.32	+51 8	9.830$_n$	.....	11	23, .	R.	" "
18	15 30 56	+1 6.27	+ 8 25.7	13 35 49.53	+55 40 30.1	9.863$_n$	9.803	12	15, 6	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	9 21 38.98	+1.82	+14 54 8.7	−12.1	½ (Berlin A, A. G. 3809+Leipzig I, A. G. 3748).	

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COMET 1906 VII—Continued.

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
2	9 27 56.04	+1.81	+16 9 30.7	−12.8	Berlin A, A. G. 3845	
3	9 40 38.64	+1.79	+19 7 1.1	−14.4	" " " 3918	Seeing good.
4	10 15 46.12	+1.76	+28 12 16.9	−19.0	Camb., Eng., A. G. 5311	
5	10 24 28.28	+1.72	+29 59 34.4	−19.8	Leiden, A. G. 4192	Haze.
6	10 26 41.77	+1.74	+31 15 1.3	−20.3	" " 4206	Seeing good.
7	10 27 52.03	+1.73	+31 14 32.5	−20.3	" " 4217	Seeing good.
8	10 37 29.41	+1.67	+32 33 32.7	−20.9	" " 4258	
9	10 57 25.64	+1.57	+36 50 32.0	−22.6	Lund, A. G. 5100	Seeing fair; wind.
10	11 6 14.80	+1.50	+38 12 30.5	−23.1	" " 5142	
11	12 36 58.89	+0.66	+50 55 53.5	−25.9	Camb., U. S., A. G. 4121	Seeing good.
12	13 34 43.32	−0.06	+55 32 29.3	−24.9	Hels.-Gotha, A. G. 7643	Seeing good.

COMET 1907 a.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Mar. 11	7 47 56	+1 34.38	−0 48.7	6 58 22.98	−16 19 50.0	7.882	0.858	1	25, 5	R.	12-inch
13	7 40 28	+0 11.77	+1 7.8	6 53 8.72	−14 30 1.1	8.282	0.847	2	31, 6	R.	" "
15	7 37 53	+0 42.67	+2 11.9	6 48 20.96	−12 43 53.7	8.598	0.837	3	21, 7	R.	" "
16	9 12 47	+1 45.21	−3 46.8	6 45 57.91	−11 48 55.6	9.371	0.819	4	18, 6	R.	" "
17	8 41 51	+0 40.39	−3 9.3	6 43 52.56	−10 59 33.9	9.277	0.819	5	12, 4	R.	" "
Apr. 2	8 0 38	+1 46.10	+5 12.4	6 20 53.89	+0 6 34.4	9.420	0.739	6	25, 5	R.	26-inch
15	7 58 28	+1 49.68	−8 9.7	6 12 50.05	+6 25 41.1	9.543	0.696	7	10, 2	Hd.	" "
May 11	8 37 10	−0 47.08	+8 33.6	6 11 25.63	+14 43 9.9	9.674	0.713	8	3, 3	R.	" "
Dec. 7	10 42 30	+1 46.27	−0 33.9	3 13 35.69	+50 12 35.8	8.996	0.230_n	9	25, 5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	6 56 48.30	+0.30	−16 18 45.3	−16.0	Washington, A. G. 2395	Seeing good; slightly hazy; comet exceedingly faint; had a faint, star-like nucleus
2	6 52 56.72	+0.23	−14 30 53.3	−15.6	" " 2355	Seeing good; comet becoming brighter; haze.
3	6 47 38.13	+0.16	−12 45 50.3	−15.3	Camb., U. S., A. G. Zones	Seeing good; comet becoming brighter.
4	6 44 12.59	+0.11	−11 44 53.6	−15.2	" " " "	Sky thick; seeing steady; comet very faint; observation difficult but fairly good.
5	6 43 12.09	+0.08	−10 56 9.6	−15.0	" " " "	Seeing steady; clouds interfere; observation difficult.
6	6 19 8.16	−0.37	+0 1 33.6	−11.8	Nicolajew, A. G. 1659	Seeing good.
7	6 11 1.01	−0.64	+6 34 0.1	−9.3	Leipzig II, A. G. 2752	
8	6 12 13.67	−0.96	+14 34 42.3	−6.0	Leipzig I, A. G. 2145	Sky clear; comet very faint.
9	3 11 44.88	+4.54	+50 12 55.2	+14.5	½ (Camb., U. S., A. G. 1436+Bonn, A. G. 2749)	Comet very faint, with nucleus about mag. 14.

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COMET 1907 b.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Apr. 15	8 42 37	−0 31.61	+11 20.6	6 52 32.45	+13 33 45.8	9.560	0.636	1	12, 4	R.	12-inch
16	8 41 2	−0 35.07	+ 5 11.2	7 2 53.52	+18 32 43.9	9.558	0.576	2	20, 7	R.	" "
17	9 0 29	+2 9.45	+ 5 5.7	7 12 13.77	+22 47 6.7	9.592	0.536	3	15, 5	R.	" "
May 4	9 41 29	+0 6.22	− 1 11.8	8 28 15.29	+46 35 17.2	9.776	0.114	4	5, 4	R.	26-inch
11	9 56 1	−1 40.51	+ 8 0.0	8 43 3.72	+49 4 0.2	9.808	0.202	5	6, 3	R.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	6 53 4.50	−0.44	+13 22 31.8	−6.6	Leipzig I, A. G. 2623	Seeing fair; comet faint and diffuse; roughly oval in outline.
2	7 3 29.01	−0.42	+18 27 37.4	−4.7	Berlin A, A. G. 2636	Seeing fair; sky thick; comet faint.
3	7 10 4.74	−0.42	+22 42 4.1	−3.1	Berlin B, A. G. 2856	Seeing poor; bright moonlight; clouds; poor observation.
4	8 28 9.49	−0.42	+46 36 22.5	+6.5	Micrometer comparison with— Bonn, A. G. 6676 $\{\Delta\alpha = -2^m 10^s.57$ $\Delta\delta = +7'31''.6$	
5	8 44 44.74	−0.51	+48 55 52.5	+7.7	Bonn, A. G. 6806	Comet very faint and diffuse.

COMET 1907 c.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
June 3	10 1 15	+0 22.73	−0 55.6	10 23 45.73	+23 49 44.3	9.659	0.590	1	6, 6	Hd.	26-inch
8	9 49 41	+3 12.17	+1 34.2	10 45 26.80	+23 5 33.6	9.644	0.581	2	5, 6	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	10 23 23.00	0.00	+23 50 37.6	+2.3	Berlin B, A. G. 4024	Comet extremely faint; observation very difficult.
2	10 42 14.58	+0.05	+23 3 56.7	+2.7	" " " 4098	Comet faint and diffuse; observation difficult.

COMET 1907 d.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
June 14	14 33 23	−1 56.63	−8 46.7	0 2 9.96	+0 1 43.4	9.596_n	0.740	1	25, 5	Hd.	26-inch

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COMET 1907 d—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h. m. s	m. s	′ ″	h. m. s	° ′ ″						
June 15	14 37 43	+1 54.30	+ 0 5.1	0 5 4.28	+ 0 16 27.2	9.590$_n$	0.739	2	20, 4	Hd.	26-inch
16	15 51 23	−0 18.39	− 4 45.4	0 8 11.12	+ 0 32 13.3	9.466$_n$	0.736	3	12, 4	R.	" "
19	14 46 27	−0 35.47	− 0 24.4	0 17 19.37	+ 1 18 5.7	9.575$_n$	0.733	4	25, 5	Hd.	" "
21	14 28 6	−3 15.28	− 6 27.4	0 23 49.15	+ 1 50 19.6	9.596$_n$	0.731	5	20, 4	R.	" "
26	15 8 10	+0 56.40	+ 3 49.7	0 41 42.53	+ 3 17 38.8	9.539$_n$	0.718	6	35, 6	R.	12-inch
30	15 39 14	+1 3.71	− 4 17.4	0 57 47.58	+ 4 33 49.5	9.482$_n$	0.705	7	25, 5	R.	26-inch
July 5	15 32 32	−0 52.38	+ 6 5.8	1 20 27.40	+ 6 17 1.5	9.503$_n$	0.692	8	25, 5	R.	" "
8	14 51 14	−1 8.27	− 3 17.4	1 35 35.75	+ 7 22 57.2	9.577$_n$	0.694	9	25, 5	Fn.	" "
13	15 19 36	−2 23.16	+12 43.9	2 4 27.69	+ 9 21 7.4	9.551$_n$	0.673	10	25, 5	Fn.	" "
16	15 5 2	+0 47.67	− 0 19.0	2 23 50.62	+10 34 24.0	9.584$_n$	0.672	11	25, 5	Fn.	" "
20	15 20 45	+2 46.32	− 9 4.8	2 52 36.95	+12 13 16.6	9.583$_n$	0.657	12	25, 5	Fn.	" "
30	15 14 43	−2 54.04	+ 4 35.1	4 17 24.92	+15 48 18.0	9.644$_n$	0.662	13	19, 4	R.	12-inch
Aug. 12	15 29 28	+1 14.92	− 5 56.3	6 19 10.28	+17 20 26.8	9.676$_n$	0.695	14	15, 3	Hd.	26-inch
18	15 57 22	−1 46.25	+ 0 9.4	7 10 58.73	+16 42 38.6	9.674$_n$	0.698	15	15, 3	Fn.	" "
25	16 23 38	+2 14.93	+ 2 16.1	8 5 20.98	+15 18 1.1	9.671$_n$	0.703	16	20, 4	R.	12-inch
Sept. 13	16 44 8	−0 41.62	− 4 5.0	10 7 53.15	+ 9 34 41.6	9.666$_n$	0.732	17	11, 4	R.	" "
Nov. 15	17 24 21	−0 51.03	− 0 23.3	13 38 2.07	− 5 43 32.0	9.633$_n$	0.757	18	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	0 4 6.36	+0.23	+ 0 10 28.5	+1.6	Nicolajew, A. G. 11	Comet bright and globular with central nucleus.
2	0 3 9.71	+0.27	+ 0 16 20.3	+1.8	" " 9	Comet bright.
3	0 8 29.24	+0.27	+ 0 36 56.9	+1.8	" " 19	Observation poor on account of approaching daylight.
4	0 17 54.53	+0.31	+ 1 18 28.3	+1.8	½ (Nicolajew, A. G. 51+Albany, A. G. 65)	
5	0 27 4.11	+0.32	+ 1 56 45.2	+1.8	Albany, A. G. 99	Comet very bright.
6	0 40 45.72	+0.41	+ 3 13 46.9	+2.2	" " 183	Seeing fair; thin clouds; comet quite bright in full moonlight.
7	0 56 43.42	+0.45	+ 4 38 4.7	+2.2	" " 261	Comet bright in moonlight; star-like nucleus.
8	1 21 19.32	+0.46	+ 6 10 53.7	+2.0	Leipzig II, A. G. 526	Nucleus sharp; comet very bright.
9	1 36 43.54	+0.48	+ 7 26 12.8	+1.8	" " " 637	Comet bright though sky was thick.
10	2 6 50.38	+0.47	+ 9 8 21.9	+1.6	" " " 829	
11	2 23 2.47	+0.48	+10 34 41.8	+1.2	Leipzig I, A. G. 718	
12	2 49 50.17	+0.46	+12 22 20.8	+0.6	" " " 866	
13	4 20 18.67	+0.29	+15 43 43.7	−0.8	Berlin A, A. G. 1171	Seeing fair; sky thick.
14	6 17 55.27	+0.09	+17 26 24.8	−1.7	" " " 2111	The comet a magnificent object, easily visible to the naked eye.
15	7 12 44.97	+0.01	+16 42 31.1	−1.9	Newcomb's Fund. Cat. 469	
16	8 3 6.07	−0.02	+15 15 46.5	−1.5	Berlin A, A. G. 3207	Seeing fair.
17	10 8 34.80	−0.03	+ 9 38 47.6	−1.0	Leipzig II, A. G. 5399	Seeing fair; observation hurried.
18	13 38 52.62	+0.48	− 5 43 6.3	−2.4	Straszburg, A. G. 4920	

COMET 1907 e.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 15	16 51 33	+0 50.37	+3 18.1	8 25 33.39	−8 39 25.2	9.360$_n$	0.801	1	15, 3	Fn.	12-inch

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COMET 1907 e—Continued.

DATE.	WASHINGTON MEAN TIME.	COMET–STAR.		COMET'S APPARENT		LOG $p\Delta$.		STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
		$\Delta\alpha$	$\Delta\delta$	α	δ	α	δ				
1907	h m s	m s	′ ″	h m s	° ′ ″						
Oct. 16	16 42 30	−0 28.32	+0 33.1	8 22 37.50	− 8 13 51.9	9.367$_n$	0.799	2	30, 6	Fn.	26-inch
17	16 19 16	+0 31.81	+8 43.3	8 19 32.32	− 7 47 0.7	9.415$_n$	0.793	3	25, 5	Fn.	" "
18	16 13 53	+0 29.10	−3 0.2	8 16 12.27	− 7 18 5.1	9.410$_n$	0.789	4	24, 5	Fn.	" "
20	16 51 40	−0 35.67	−0 45.8	8 8 42.28	− 6 13 2.6	9.208$_n$	0.790	5	25, 5	Fn.	" "
21	17 12 26	−1 9.85	−3 2.0	8 4 32.20	− 5 36 44.3	9.025$_n$	0.787	6	30, 5	Fn.	" "
Nov. 7	14 53 40	+1 49.34	−3 14.6	5 35 41.85	+14 26 59.3	8.682	0.559	7	25, 5	Fn.	12-inch
13	12 27 46	+3 16.25	+1 29.9	3 56 23.50	+23 37 7.7	6.162	0.360	8	25, 5	Fn.	26-inch

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	RED. TO APP. PLACE.	δ	RED. TO APP. PLACE.	AUTHORITY.	REMARKS.
	h m s	s	° ′ ″	″		
1	8 24 42.00	+1.02	− 8 42 46.3	+3.0	Wien-Ottakring, A. G. 3273	Hazy; comet faint and diffuse; has no nucleus; poor observation.
2	8 23 4.76	+1.06	− 8 14 27.9	+2.9	" " " 3257	
3	8 18 59.40	+1.11	− 7 55 46.9	+2.9	" " " 3214	
4	8 15 42.01	+1.16	− 7 15 7.6	+2.7	" " " 3185	
5	8 9 16.69	+1.26	− 6 12 19.2	+2.4	½ (Wien-Ottakring, A. G. 3123+Straszburg, A. G. 3119).	
6	8 5 40.73	+1.32	− 5 33 44.5	+2.2	Straszburg, A. G. 3084	
7	5 33 49.73	+2.78	+14 30 12.8	+1.1	Leipzig I, A. G. 1729	Seeing good; comet faint and diffuse.
8	3 53 3.95	+3.30	+23 35 30.6	+7.2	Berlin B, A. G. 1274	

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OBSERVATIONS OF OCCULTATIONS OF STARS BY THE MOON.

A 355

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OCCULTATIONS.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
			SIDEREAL.	MEAN.					
1894			h m s	h m s					
June 12	α Virginis	RB	13 23 19.0	7 57 58.4	..	..	Hill	9.6-inch	
Oct. 15	27 Arietis	DB	22 41 33.1	9 3 12.3	..	..	F.	9.6-inch	
15	27 Arietis	RD	23 48 30.0	10 9 58.3	..	..	F.	9.6-inch	Somewhat uncertain.
16	66 Arietis	DB	0 10 41.4	10 28 10.1	..	..	F.	9.6-inch	
19	49 Aurigæ	DB	0 32 41.8	10 38 19.1	..	..	F.	9.6-inch	
19	54 Aurigæ	DB	2 31 52.6	12 37 10.5	..	..	F.	9.6-inch	
19	54 Aurigæ	RD	3 14 9.1	13 19 20.0	..	..	F.	9.6-inch	
19	25 Geminorum	DB	3 11 39.1	13 16 50.4	..	..	F.	9.6-inch	
19	25 Geminorum	RD	4 17 25.0	14 22 25.6	..	..	F.	9.6-inch	
20	c Geminorum	DD	3 9 1.4	13 10 17.2	..	..	F.	9.6-inch	
Nov. 3	ω Sagittarii	DD	0 2 8.9	9 8 52.6	..	..	F.	9.6-inch	
1895									
Jan. 11	γ Cancri	DB	8 58 0.5	13 31 58.5	..	..	F.	9.6-inch	
11	γ Cancri	RD	9 34 15.0	14 8 7.1	..	..	F.	9.6-inch	
Mar. 5	49 Aurigæ	DD	10 9 13.6	11 14 36.7	..	..	F.	9.6-inch	Clouds.
17	γ^1 Sagittarii	RD	16 25 21.4	16 42 32.0	..	..	F.	9.6-inch	
Sept. 30	64 Aquarii	DD	20 7 37.8	7 29 37.6	..	..	F.	26-inch	
30	64 Aquarii	RB	21 29 48.3	8 51 34.7	..	..	F.	26-inch	
Oct. 3	δ Piscium	DB	22 17 1.1	9 26 52.0	..	..	Bn.	9.6-inch	
Nov. 3	17 Tauri	DB	21 27 14.0	6 35 19.9	..	..	Hill	9.6-inch	
3	g Pleiadum	DB	21 33 9.8	6 41 14.8	..	..	Hill	9.6-inch	
3	g Pleiadum	RD	22 25 47.3	7 33 43.6	..	..	Hill	9.6-inch	
3	5 Pleiadum	DB	21 43 57.2	6 52 0.4	..	..	Hill	9.6-inch	
3	12 Pleiadum	DB	21 59 11.6	7 7 12.3	..	..	Hill	9.6-inch	
3	19 Tauri	DB	22 2 28.5	7 10 28.6	..	..	Hill	9.6-inch	
3	20 Tauri	RD	22 55 22.2	8 3 13.7	..	..	Hill	9.6-inch	
3	21 Tauri	DB	22 27 34.7	7 35 30.7	..	..	Hill	9.6-inch	
3	21 Tauri	RD	22 47 14.0	7 55 6.8	..	..	Hill	9.6-inch	
3	20 Pleiadum	DB	22 35 3.7	7 42 58.5	..	..	Hill	9.6-inch	
3	20 Pleiadum	RD	23 31 20.4	8 39 6.0	..	..	Hill	9.6-inch	
3	33 Pleiadum	DB	22 38 43.1	7 46 37.3	..	..	Hill	9.6-inch	
3	33 Pleiadum	RD	23 30 22.1	8 38 7.8	..	..	Hill	9.6-inch	
3	6 Pleiadum	RD	22 44 3.1	7 51 56.4	..	..	Hill	9.6-inch	
3	8 Pleiadum	RD	22 49 14.9	7 57 7.4	..	..	Hill	9.6-inch	
3	22 Tauri	RD	22 55 42.9	8 3 34.3	..	..	Hill	9.6-inch	
3	39 Pleiadum	DB	23 10 33.0	8 18 22.0	..	..	Hill	9.6-inch	
3	39 Pleiadum	RD	23 55 12.8	9 2 54.5	..	..	Hill	9.6-inch	
3	44 Pleiadum	DB	23 36 56.6	8 44 41.3	..	..	Hill	9.6-inch	
3	44 Pleiadum	RD	0 17 12.1	9 24 50.2	..	..	Hill	9.6-inch	

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OCCULTATIONS—Continued.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRU-MENT.	REMARKS.
			SIDEREAL.	MEAN.					
1895			h m s	h m s					
Nov. 3	30 Pleiadum	RD	23 38 44.9	8 46 29.3	..	..	Hill	9.6-inch	
3	45 Pleiadum	DB	23 43 21.5	8 51 5.1	..	..	Hill	9.6-inch	
3	29 Pleiadum	RD	23 45 31.2	8 53 14.5	..	..	Hill	9.6-inch	
3	52 Pleiadum	DB	0 19 45.6	9 27 23.3	..	..	Hill	9.6-inch	
1896									
Jan. 28	κ Geminorum	DD	6 11 25.4	9 39 57.0	..	..	B.	12-inch	
Feb. 21	Weisse iv, 95	DD	7 4 23.3	8 58 24.3	..	..	F.	12-inch	
21	Weisse iv, 138	DD	8 12 3.0	10 5 53.0	..	..	F.	12-inch	
21	B. D. +25° 693	DD	8 52 3.5	10 45 46.9	..	..	F.	12-inch	
27	α Leonis	DD	5 17 44.6	6 48 27.7	..	..	F.	12-inch	
27	α Leonis	RB	6 9 7.6	7 39 42.3	..	..	F.	12-inch	
Apr. 15	19 Tauri	DD	10 19 18.3	8 40 28.4	..	..	F.	12-inch	
15	18 Tauri	DD	10 31 6.0	8 52 14.3	..	..	F.	12-inch	
15	21 Tauri	DD	10 33 29.2	8 54 10.8	..	..	F.	12-inch	
15	22 Tauri	DD	10 37 30.6	8 58 37.7	..	..	F.	12-inch	
22	44 Leonis	DB	15 23 31.0	13 16 19.9	..	..	F.	12-inch	
June 30	11 Piscium	DB	19 59 0.7	13 19 46.6	..	..	F.	12-inch	
30	11 Piscium	RD	21 12 24.1	14 32 58.0	..	..	F.	12-inch	
30	13 Piscium	DB	22 27 43.8	15 48 5.3	..	..	F.	12-inch	
Aug. 2	21 Tauri	DB	21 0 35.9	12 11 26.6	..	..	F.	12-inch	
2	21 Tauri	RD	21 37 36.5	12 48 21.1	..	..	F.	12-inch	
2	20 Tauri	DB	21 0 58.5	12 11 49.1	..	..	F.	12-inch	
2	20 Tauri	RD	21 35 32.9	12 46 17.9	..	..	F.	12-inch	
2	22 Tauri	DB	21 3 17.9	12 14 8.2	..	..	F.	12-inch	
2	22 Tauri	RD	21 58 1.6	13 8 42.9	..	..	F.	12-inch	
2	g Pleiadum	RD	21 11 52.9	12 22 41.8	..	..	F.	12-inch	
1897									
Feb. 13	B. A. C. 2363	DD	9 29 28.7	11 51 34.2	..	..	F.	12-inch	
Sept. 18	139 Tauri	DB	23 9 37.7	11 16 16.4	..	..	F.	12-inch	
18	139 Tauri	RD	0 5 47.2	12 12 16.7	..	..	F	12-inch	
Oct. 6	B. A. C. 7774	DD	20 20 45.0	7 17 5.1	..	..	F.	12-inch	
8	22 Piscium	DD	22 14 44.7	9 2 54.3	..	..	F.	12-inch	
12	ϵ Arietis	DB	21 35 29.0	8 8 1.3	..	..	F.	12-inch	
12	ϵ Arietis	RD	22 36 25.0	9 8 47.4	..	..	F.	12-inch	
13	26 Tauri	RD	22 7 5.0	8 35 36.3	..	..	F.	12-inch	
13	28 Tauri	DB	21 32 48.5	8 1 25.4	..	..	F.	12-inch	
13	28 Tauri	RD	22 24 12.5	8 52 41.0	..	..	F.	12-inch	
13	27 Tauri	DB	21 25 58.5	7 54 36.5	..	..	F.	12-inch	
13	27 Tauri	RD	22 23 40.0	8 52 8.6	..	..	F.	12-inch	

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OCCULTATIONS—Continued.

DATE.		OBJECT.	PHENOM.	WASHINGTON TIME SIDEREAL.	WASHINGTON TIME MEAN.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1897				h m s	h m s					
Oct. 15	125	Tauri.....	DB	0 20 28.4	10 40 46.0	..	..	F.	12-inch	
17	58	Geminorum.....	RD	0 53 12.9	11 5 33.3	..	..	F.	12-inch	
Dec. 12	θ	Cancri.....	RD	2 7 36.5	8 39 33.7	..	..	F.	12-inch	
27	θ	Aquarii.....	DD	0 20 39.6	5 53 55.7	..	..	F.	12-inch	
27	θ	Aquarii.....	RB	1 25 22.1	6 58 27.6	..	..	F.	12-inch	
1898										
Jan. 5	125	Tauri.....	DD	0 45 36.2	5 43 25.0	..	..	F.	12-inch	
5	125	Tauri.....	RB	1 56 39.2	6 54 16.3	..	..	F.	12-inch	Probably a little late.
Feb. 13	A_2	Scorpii.....	RD	12 25 25.7	14 47 59.4	..	..	F.	12-inch	
13	3	Scorpii.....	RD	12 41 5.7	15 3 36.8	..	..	F.	12-inch	
25	26	Arietis.....	DD	6 6 21.1	7 42 46.0	..	..	F.	12-inch	
25	26	Arietis.....	RB	7 18 41.6	8 54 54.6	..	..	F.	12-inch	
June 30	A_2	Scorpii.....	DD	15 31 15.7	8 54 39.3	..	..	F.	12-inch	
30	A_2	Scorpii.....	RB	16 41 34.7	10 4 46.8	..	..	F.	12-inch	Probably a little late.
30	3	Scorpii.....	RB	17 16 58.7	10 40 5.0	..	..	F.	12-inch	
Sept. 27		B. A. C. 7951.....	DD	20 16 45.0	7 49 25.9	..	..	F.	12-inch	First component.
27		B. A. C. 7951.....	DD	20 16 53.0	7 49 33.9	..	..	F.	12-inch	Second component.
27		B. A. C. 7951.....	RB	20 55 45.0	8 28 19.6	..	..	F.	12-inch	Mean somewhat uncertain.
Dec. 27*		Anonymous.....	D	0 28 48.7	6 3 0.5	..	..	Br.	26-inch	
27*	75	(B. D.+23° 1425).	D	0 33 38.7	6 7 49.7	..	49	Hill	5-in.alt-az.	Observed eye and ear.
27*	75	(B. D.+23° 1425).	R	1 23 22.8	6 57 25.6	..	49	Hill	5-in.alt-az.	Observed eye and ear.
27*	75	(B. D.+23° 1425).	D	0 33 38.5	6 7 49.5	..	..	Br.	26-inch	
27*	75	(B. D.+23° 1425).	R	1 23 23.0	6 57 25.8	..	..	Br.	26-inch	
27*	64	(B. D.+22° 1392).	R	0 41 36.7	6 15 46.4	..	49	Hill	5-in.alt-az.	Observed eye and ear.
27*	64	(B. D.+22° 1392).	R	0 41 23.1	6 15 32.8	..	..	Br.	26-inch	
27*	79	.....	D	0 53 43.6	6 27 51.3	..	..	F.	12-inch	
27*		Anonymous.....	D	0 59 7.3	6 33 14.1	..	..	Br.	26-inch	
27*	70	(B. D.+23° 1415).	R	1 7 3.3	6 41 8.8	..	..	Br.	26-inch	
27*	71	(B. D.+23° 1416).	R	1 7 37.9	6 41 43.3	..	..	F.	12-inch	
27*	84	(B. D.+22° 1410).	D	1 13 36.7	6 47 41.1	..	49	Hill	5-in.alt-az.	Observed eye and ear.
27*	84	(B. D.+22° 1410).	R	1 40 28.7	7 14 28.7	..	49	Hill	5-in.alt-az.	Observed eye and ear.
27*	84	(B. D.+22° 1410).	D	1 13 36.9	6 47 41.3	..	..	F.	12-inch	
27*	84	(B. D.+22° 1410).	D	1 13 36.1	6 47 40.6	..	..	Br.	26-inch	
27*	84	(B. D.+22° 1410).	R	1 40 28.3	7 14 28.3	..	..	Br.	26-inch	
27*	78	.....	R	1 34 37.7	7 8 38.7	..	..	F.	12-inch	
27*	78	.....	R	1 34 29.2	7 8 30.2	..	..	Br.	26-inch	
27*	96	(B. D.+23° 1439).	D	1 37 19.6	7 11 20.1	..	..	Br.	26-inch	
27*	87	(B. D.+23° 1432).	R	1 40 30.5	7 14 30.5	..	..	F.	12-inch	Some question as to identity of star.
27*	80	.....	R	1 41 16.8	7 15 16.7	..	..	F.	12-inch	

*Observations made during eclipse of Moon. The numbers of the stars are taken from the Pulkowa Circular of October, 1898.

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OCCULTATIONS—Continued.

DATE	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
			SIDEREAL.	MEAN.					
			h m s	h m s					
1899									
Feb. 27	g Virginis	DB	10 47 13.4	12 15 57.4	..	...	F.	12-inch	
27	g Virginis	RB	11 18 7.4	12 46 46.4	..	...	F.	12-inch	
Mar. 17	99 Tauri	DD	7 1 51.9	7 20 26.5	..	...	F.	12-inch	
17	99 Tauri	RB	7 49 25.9	8 7 52.7	..	...	F.	12-inch	Uncertain.
Sept. 18	κ Piscium	DD	23 34 52.	11 43 20.	..	...	See	12-inch	
18	9 Piscium	DD	23 45 42.	11 54 9.	..	...	See	12-inch	
Oct. 21	τ Tauri	DB	0 36 58.	10 35 32.	..	...	See	12-inch	
1900									
July 10	Saturn (Center)	DD	17 56 25.	10 42 0.	f-g	...	See	26-inch	
1901									
Oct. 6	B. D.+11° 1988	DB	4 36 0.7	15 34 48.3	..	115	K.	12-inch	Poor observation.
6	B. D.+11° 1988	RD	5 21 17.3	16 19 57.5	..	115	K.	12-inch	
6	κ Cancri	RD	4 53 58.5	15 52 43.2	..	115	K.	12-inch	
21	ν Aquarii	DD	2 6 47.8	12 7 1.3	..	160	K.	12-inch	
24	22 Piscium	DD	4 13 55.5	14 2 0.4	..	160	K.	12-inch	
25	δ Piscium	DD	4 17 12.8	14 1 21.1	...	160	K.	12-inch	
Nov. 19	Lal. 43777	DD	22 50 43.9	6 57 28.1	..	115	K.	12-inch	
30	ω Leonis	DB	7 2 13.0	14 24 21.7	..	115	K.	12-inch	
30	ω Leonis	RD	8 24 19.4	15 46 14.7	..	115	K.	12-inch	Uncertain.
1902									
Jan. 14	λ Piscium	DD	3 50 5.9	8 15 50.0	..	160	K.	12-inch	
19	ϵ Tauri	DD	6 47 44.0	10 53 19.5	..	115	K.	12-inch	
19	ϵ Tauri	RB	7 56 31.2	12 1 55.4	..	115	K.	12-inch	
Feb. 18	λ Geminorum	DD	11 56 27.4	14 3 15.1	p	235	K.	12-inch	Uncertain.
18	λ Geminorum	RB	12 16 2.3	14 22 46.8	p	235	K.	12-inch	
Mar. 19	A^2 Cancri	DD	8 29 37.8	8 42 58.0	..	115	K.	12-inch	Unsteady.
July 23	Lal. 44872	DB	23 58 16.8	15 53 40.3	g	115	K.	12-inch	
23	Lal. 44872	RD	1 18 28.6	17 13 39.0	g	115	K.	12-inch	
Dec. 17	A^1 Cancri	DB	3 33 20.9	9 50 10.7	g	115	K.	12-inch	Uncertain.
17	A^1 Cancri	RD	4 34 25.3	10 51 5.1	g	115	K.	12-inch	
1903									
Jan. 9	B. A. C. 1272	DD	9 49 29.2	14 34 51.5	..	115	K.	12-inch	
12	λ Geminorum	RB	10 16 2.7	14 49 32.9	..	115	K.	12-inch	
Feb. 8	26 Geminorum	DD	7 32 24.3	10 20 11.7	f	115	K.	12-inch	
8	26 Geminorum	RB	8 48 39.6	11 36 14.5	f	115	K.	12-inch	
May 4	B. D.+14° 2788	DD	11 35 8.8	8 48 4.4	e	115	K.	12-inch	
7	B. A. C. 4200	DD	16 16 39.9	13 17 1.7	g	115	K.	12-inch	
June 3	W. B. XII, 69	DD	16 23 39.7	11 37 50.8	g	115	K.	12-inch	Uncertain.
8	χ Ophiuchi	DD	15 39 20.8	10 33 59.6	..	115	K.	12-inch	
8	χ Ophiuchi	RB	17 10 56.3	12 5 20.0	..	115	K.	12-inch	Probably late.
15	θ Aquarii	DB	19 0 30.2	13 27 4.6	g	115	K.	12-inch	

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OCCULTATIONS—Continued.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRU-MENT.	REMARKS.
			SIDEREAL.	MEAN.					
1903			h m s	h m s					
June 15	ρ Aquarii.....	DB	21 30 33.5	15 56 43.3	g	115	K.	12-inch	
15	ρ Aquarii.....	RD	22 1 39.0	16 27 43.7	g	115	K.	12-inch	
July 10	B. A. C. 7063.....	DB	22 8 18.8	14 56 4.7	..	115	K.	12-inch	
Aug. 5	ρ^1 Sagittarii.....	DD	18 29 17.2	9 35 25.3	..	115	K.	12-inch	
5	ρ^1 Sagittarii.....	RB	20 3 25.1	11 9 17.8	...	115	K.	12-inch	Uncertain.
7	9 Aquarii.....	DB	20 14 56.8	11 12 55.8	p	115	K.	12-inch	
7	9 Aquarii.....	RB	21 9 41.0	12 7 31.0	p	115	K.	12-inch	
Sept. 5	ρ Aquarii.....	DD	20 50 20.6	9 54 12.5	f	115	Hd.	12-inch	
5	ρ Aquarii.....	RB	22 11 46.2	11 15 24.7	f	115	Hd.	12-inch	
6	B. A. C. 8094.....	RB	3 41 38.4	16 40 27.0	..	115	Hd.	12-inch	
12	55 Tauri.....	DB	2 54 49.0	15 30 9.8	f	115	Hd.	12-inch	
12	55 Tauri.....	RD	4 19 26.2	16 54 33.1	f	115	Hd.	12-inch	
12	63 Tauri.....	DB	5 15 26.3	17 50 24.1	f	115	Hd.	12-inch	
15	λ Geminorum.....	DB	3 39 43.5	16 3 9.3	f	115	P.	12-inch	
15	λ Geminorum.....	RD	4 48 7.6	17 11 22.2	f	115	P.	12-inch	
Oct. 2	36 Aquarii.....	DD	2 29 3.6	13 45 50.5	f	115	K.	12-inch	
28	8 Aquarii.....	DD	0 4 17.4	9 39 14.4	g	115	K.	12-inch	
Nov. 2	73 Piscium.....	DD	5 6 21.2	14 20 49.2	f	115	K.	12-inch	
11	o Leonis.....	DB	6 56 42.6	15 35 29.4	g	115	K.	12-inch	
11	o Leonis.....	RD	8 1 50.9	16 40 27.0	e	115	K.	12-inch	
30	96 Piscium.....	DD	3 26 24.5	10 51 3.4	g	115	Hd.	12-inch	
30	96 Piscium.....	RB	4 43 39.0	12 8 5.3	g	115	Hd.	12-inch	
1904									
Jan. 3	1 Cancri.....	DB	7 9 59.8	12 20 21.2	f	115	Hd.	12-inch	
3	1 Cancri.....	RD	8 26 37.1	13 36 45.9	f	115	Hd.	12-inch	
5	B. A. C. 3398.....	DB	6 29 46.2	11 32 22.3	g	115	Hd.	12-inch	Uncertain.
5	B. A. C. 3398.....	RD	7 9 55.3	12 12 24.8	g	115	Hd.	12-inch	
25	ξ Arietis.....	DD	2 39 59.0	6 24 34.5	g	115	Hd.	12-inch	
25	ξ Arietis.....	RB	4 3 1.2	7 47 23.0	g	115	Hd.	12-inch	Probably late.
Feb. 22	W. B. II, 1033....	DD	8 19 54.3	10 13 28.7	g	115	Hd.	12-inch	
Mar. 22	B. A. C. 1406.....	DD	6 59 18.7	6 59 5.1	..	115	Hd.	12-inch	Clouds.
22	B. A. C. 1406.....	RB	7 28 8.9	7 27 50.5	..	115	Hd.	12-inch	Uncertain.
22	α Tauri.....	DD	7 59 12.4	7 58 48.9	..	115	Hd.	12-inch	Clouds.
22	α Tauri.....	RB	9 5 25.1	9 4 50.8	..	115	Hd.	12-inch	
22	α Tauri.....	DD	7 59 12.8	7 58 49.3	..	...	D.	26-inch	
22	α Tauri.....	RB	9 5 25.2	9 4 50.8	..	...	D.	26-inch	
Apr. 1	2 Librae.....	DB	13 53 40.4	13 12 59.8	p	115	Hd.	12-inch	Poor observation.
1	2 Librae.....	RD	15 0 48.2	14 19 56.6	p	115	Hd.	12-inch	Uncertain.
1	B. A. C. 4772.....	DB	14 26 44.5	13 45 58.5	p	115	Hd.	12-inch	Poor observation.
1	B. A. C. 4772.....	RD	15 47 21.7	15 6 22.5	p	115	Hd.	12-inch	
2	o^2 Librae.....	DB	15 46 16.5	15 1 21.5	p	115	Hd.	12-inch	Uncertain.
21	λ Geminorum.....	DD	12 28 15.5	10 29 10.7	g	115	Hd.	12-inch	

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OCCULTATIONS—Continued.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRU-MENT.	REMARKS.
			SIDEREAL.	MEAN.					
1904			h m s	h m s					
May 21	B. A. C. 3398.....	DD	14 47 11.7	10 49 47.0	g	115	Hd.	12-inch	
Aug. 5	γ Tauri.....	DB	22 54 28.6	13 56 54.8	g	115	R.	12-inch	
5	γ Tauri.....	RD	23 53 21.6	14 55 38.2	g	115	R.	12-inch	
23	W. B. XX, 1293...	DD	1 26 56.9	15 18 11.9	..	115	R.	12-inch	
Oct. 11	η Libræ.....	DD	20 20 23.4	6 59 49.1	p	235	R.	12-inch	
26	75 Tauri.....	RD	6 48 14.1	16 26 58.4	..	160	Fn.	12-inch	
26	B. A. C. 1391.....	RD	7 46 17.9	17 24 52.7	..	160	Fn.	12-inch	
26	B. A. C. 1406.....	DB	8 40 25.2	18 18 51.1	..	160	Fn.	12-inch	
26	α Tauri.....	DB	9 47 33.9	19 25 48.8	..	160	Fn.	12-inch	
27	115 Tauri.....	DB	8 47 42.3	18 22 11.1	..	235	Fn.	12-inch	
Nov. 23	B. A. C. 1526.....	DB	1 14 4.8	9 3 38.4	..	175	Fn.	26-inch	
26	5 Cancri.....	DB	9 53 13.1	17 29 33.9	g	160	Fn.	12-inch	
26	5 Cancri.....	RD	10 52 14.7	18 28 25.8	g	160	Fn.	12-inch	
Dec. 1	Mars I.....	DB	6 49 54.	14 7 5.	..	175	Hd.	26-inch	Observed eye and ear.
1	Mars II.....	DB	6 50 4.	14 7 15.	..	175	Hd.	26-inch	Observed eye and ear.
1	Mars C.....	RD	7 51 21.4	15 8 22.6	..	30	Hd.	5-inch	Observed with the finder of the 26-inch.
1	Mars I.....	DB	6 49 40.8	14 6 52.2	..	115	Fn.	12-inch	Haze.
1	Mars II.....	DB	6 49 50.3	14 7 1.6	..	115	Fn.	12-inch	
1	Mars C.....	RD	7 51 20.9	15 8 22.2	..	115	Fn.	12-inch	
14	20 Piscium.....	DD	4 22 6.6	10 48 35.3	f	115	Fn.	12-inch	
20	B. A. C. 1391.....	DD	23 18 2.7	5 21 45.7	p	115	R.	12-inch	Perhaps $0^s.15$ late.
20	B. A. C. 1394.....	DD	23 23 26.7	5 27 8.9	b	115	R.	12-inch	Perhaps $0^s.35$ late.
20	B. A. C. 1406.....	DD	0 53 17.5	6 56 44.9	f	115	R	12-inch	Fairly good observation.
20	α Tauri.....	DD	2 14 31.8	8 17 45.9	..	175	Hd.	26-inch	
20	α Tauri.....	RB	3 35 50.8	9 38 51.6	..	175	Hd.	26-inch	
20	α Tauri.....	DD	2 14 31.6	8 17 45.7	f	160	R.	12-inch	Good observation.
20	α Tauri.....	RB	3 35 50.8	9 38 51.6	f	160	R.	12-inch	
1905									
Jan. 14	B. A. C. 764.....	DD	1 57 22.9	6 22 22.0	e	115	Fn.	12-inch	
14	B. A. C. 764.....	RB	2 55 38.6	7 20 28.1	e	115	Fn.	12-inch	
16	γ Tauri.....	DD	8 38 6.8	12 54 8.4	e	235	Fn.	12-inch	
16	γ Tauri.....	RB	9 4 36.7	13 20 34.0	e	235	Fn.	12-inch	Good observation.
20	5 Cancri.....	DD	3 34 12.4	7 35 20.2	f	235	Fn.	12-inch	
20	5 Cancri.....	RB	4 34 26.4	8 35 24.3	f	235	Fn.	12-inch	
25	k Virginis.....	DB	9 46 54.2	13 27 21.4	p	115	Fn.	12-inch	
25	k Virginis.....	RD	10 53 52.9	14 34 9.1	p	115	Fn.	12-inch	
[illegible]	[illegible] Tauri	DD	10 43 15.7	13 4 55.5	p	115	Fn.	12-inch	
[illegible]	B. A. C. 1888	DD	6 46 48.3	8 57 19.1	g	235	Fn.	12-inch	
[illegible]	[illegible] Virginis	DB	16 33 41.4	18 29 48.5	..	115	Fn.	12-inch	
	[illegible]	DB	15 [illegible] 33.1	16 43 11.5	e	115	R.	12-inch	Perhaps $0^s.1$ late.
	[illegible]	RD	16 [illegible] 36.6	18 4 1.7	e	115	R.	12-inch	Perhaps $0^s.1$ late.

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OCCULTATIONS—Continued.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRU-MENT.	REMARKS.
			SIDEREAL.	MEAN.					
1905			h m s	h m s					
Feb. 26	B. D.–18°4516....	RD	13 56 27.4	15 30 24.6	f	115	R.	12-inch	Perhaps $0^s.1$ or $0^s.15$ late.
Mar. 12	70 Tauri.....	DD	6 48 53.7	7 28 58.3	p	235	Fn.	12-inch	
12	θ^1 Tauri.....	DD	8 39 29.1	9 19 15.6	p	115	Fn.	12-inch	
12	θ^2 Tauri.....	DD	8 52 57.1	9 32 41.4	p	115	Fn.	12-inch	
27	Lal. 35499.....	DB	16 44 20.9	16 23 49.4	f	115	Fn.	12-inch	
27	Lal. 35499.....	RD	18 10 54.2	17 50 8.5	f	115	Fn.	12-inch	Daylight; possibly late on account of the faintness of star.
Apr. 18	l^2 Virginis.....	DD	10 13 57.0	8 27 59.5	g	175	Fn.	26-inch	
18	l^2 Virginis.....	RB	11 20 6.6	9 33 58.2	g	175	Fn.	26-inch	
20	γ Libræ	DB	12 37 2.1	10 42 49.3	f	115	Fn.	12-inch	
20	γ Libræ	RD	13 44 22.0	11 49 58.2	f	115	Fn.	12-inch	
24	Mayer 814.....	DB	16 43 41.9	14 33 5.1	g	115	Fn.	12-inch	
24	Mayer 814.....	RD	17 38 27.5	15 27 41.7	g	115	Fn.	12-inch	
May 16	94 Virginis.....	DD	13 14 14.2	9 37 41.7	p	115	Fn.	12-inch	
June 14	η Libræ	DD	17 6 53.3	11 35 41.3	p	335	Fn.	12-inch	
14	η Libræ	RB	18 10 35.7	12 39 13.3	p	335	Fn.	12-inch	
July 9	l^2 Virginis.....	DD	17 10 9.3	10 0 39.0	..	235	Fn.	12-inch	
9	l^2 Virginis.....	RB	18 13 20.2	11 3 39.6	..	235	Fn.	12-inch	Perhaps $0^s.3$ late.
15	B. A. C. 6616.....	DD	20 17 37.7	12 44 1.2	p	...	Fn.	12-inch	
24	μ Ceti.....	DB	22 12 56.0	14 3 37.4	g	240	Fn.	12-inch	
24	μ Ceti.....	RD	23 24 49.7	15 15 19.3	g	240	Fn.	12-inch	
25	f Tauri.....	RD	22 18 41.1	14 5 25.7	..	115	R.	12-inch	
Aug. 13	Mayer 889.....	DD	0 44 36.6	15 16 15.0	f	...	Fn.	12-inch	
17	4 Ceti.....	RD	22 13 48.6	12 30 8.1	g	115	R.	12-inch	
17	5 Ceti.....	RD	22 30 59.6	12 47 16.3	g	115	R.	12-inch	
19	ν Piscium.....	DB	23 15 41.3	13 23 58.8	b	115	Fn.	12-inch	
26	f Geminorum.....	DB	1 15 23.	14 55 50.	f	115	Fn.	12-inch	Observed eye and ear.
26	f Geminorum.....	RD	2 12 43.8	15 53 0.9	f	115	Fn.	12-inch	
Sept. 8	Mayer 814.....	DD	18 51 15.2	7 41 38.0	g	115	Fn.	12-inch	
12	h Aquarii.....	DD	22 4 29.6	10 38 37.1	g	335	Fn.	12-inch	Full Moon $14^h\ 24^m$ after immersion.
12	h Aquarii.....	RB	23 17 28.0	11 51 23.5	g	335	Fn.	12-inch	
14	14 Ceti.....	DB	20 10 43.0	8 37 17.2	p	175	Fn.	26-inch	
14	14 Ceti.....	RD	21 12 29.3	9 38 53.4	p	175	Fn.	26-inch	
19	θ^1 Tauri.....	RD	21 53 49.4	10 0 27.3	p	115	Fn.	12-inch	
19	θ^2 Tauri.....	RD	21 57 56.9	10 4 34.1	p	115	Fn.	12-inch	
19	81 Tauri.....	DB	22 12 41.4	10 19 16.2	p	115	Fn.	12-inch	Moon near horizon; poor observation.
19	81 Tauri.....	RD	22 23 26.1	10 29 59.1	p	115	Fn.	12-inch	Star reappeared at terminator.
19	B. A. C. 1406.....	RD	0 32 25.9	12 38 37.8	p	115	Fn.	12-inch	

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OCCULTATIONS—Continued.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
			SIDEREAL.	MEAN.					
1905			h m s	h m s					
Sept. 19	α Tauri.....	DB	1 4 28.5	13 10 35.1	p	335	Fn.	12-inch	
19	α Tauri.....	RD	1 58 16.2	14 4 14.0	p	165	Fn.	12-inch	
Oct. 7	29 Capricorni.....	DD	0 38 45.3	11 34 9.9	f	115	Fn.	12-inch	
Nov. 10	B. A. C. 764.....	DD	2 33 57.9	11 15 22.7	..	...	Fn.	26-inch	
Dec. 4	29 Piscium.....	DD	5 17 58.1	12 24 34.2	b	240	R.	12-inch	Possibly $0^s.10$ or $0^s.15$ late.
10	α Tauri.....	DD	0 52 22.4	7 36 6.5	..	115	R.	12-inch	Not over $0^s.10$ late.
10	α Tauri.....	RB	1 58 17.0	8 41 50.3	..	115	R.	12-inch	Perhaps $0^s.10$ or $0^s.15$ late.
11	119 Tauri.....	DB	4 12 44.9	10 52 0.3	g	240	R.	12-inch	Full Moon.
11	120 Tauri.....	DB	5 6 58.6	11 46 5.1	g	240	R.	12-inch	Full Moon.
1906									
Feb. 10	σ Leonis.....	DB	11 13 51.0	13 52 6.9	e	335	Fn.	12-inch	
10	σ Leonis.....	RD	12 22 51.3	15 0 55.9	e	335	Fn.	12-inch	
16	29 Ophiuchi.....	DB	15 11 6.9	17 25 8.4	g	335	Fn.	12-inch	
16	29 Ophiuchi.....	RD	16 6 55.6	18 20 48.0	g	335	Fn.	12-inch	Good observation.
Mar. 2	B. A. C. 1406.....	DD	8 10 36.1	9 30 43.8	..	250	Fn.	26-inch	Hazy.
2	B. A. C. 1406.....	RB	8 26 53.8	9 46 58.9	..	250	Fn.	26-inch	
4	71 Orionis.....	DD	7 7 20.1	8 19 46.4	p	375	Fn.	26-inch	
4	71 Orionis.....	RB	8 35 17.7	9 47 29.6	p	375	Fn.	26-inch	Moon's limb unsteady; perhaps $0^s.3$ late.
4	B. D $+19°$ 1269...	DD	7 8 10.2	8 20 36.4	p	375	Fn.	26-inch	
Apr. 2	g Geminorum.....	DD	11 55 42.6	11 13 20.4	e	335	Fn.	12-inch	
2	g Geminorum.....	RB	12 54 15.0	12 11 43.2	e	335	Fn.	12-inch	
6	σ Leonis.....	DD	10 37 34.5	9 39 41.5	g	335	Fn.	12-inch	
6	σ Leonis.....	RB	11 27 22.5	10 29 21.3	g	335	Fn.	12-inch	
May 2	α Leonis.....	DD	14 20 44.1	11 40 0.9	p	240	Fn.	12-inch	
3	χ Leonis.....	DD	16 20 47.9	13 35 49.1	..	250	Fn.	26-inch	
8	Bradley 1987.....	DB	12 10 33.0	9 6 35.6	p	115	Fn.	12-inch	Moon near horizon; limb unsteady.
8	η Libræ	DD	13 7 30.1	10 3 23.4	..	335	Fn.	12-inch	
8	η Libræ	RD	13 17 27.0	10 13 18.6	..	335	Fn.	12-inch	
11	ξ^1 Sagittarii.....	RD	15 53 23.3	12 37 1.7	f	115	Fn.	12-inch	
June 2	65 Virginis.....	DD	16 46 32.9	12 3 32.6	g	115	Fn.	12-inch	
2	65 Virginis.....	RB	17 24 7.1	12 41 0.7	g	115	Fn.	12-inch	Moon's limb unsteady.
25	7 Leonis.....	DD	15 9 41.3	8 56 31.0	f	115	Fn.	12-inch	
Sept. 1	ι Aquarii.....	DD	18 29 40.0	7 48 35.0	p	115	Fn.	12-inch	
1	ι Aquarii.....	RB	19 23 51.2	8 42 37.3	p	115	Fn.	12-inch	
Oct. 8	χ^3 Orionis.....	RD	0 44 6.0	11 36 31.2	f	115	Fn.	12-inch	
Nov. 21	ι Capricorni.....	DD	0 38 1.1	8 37 27.3	f	115	Fn.	12-inch	
22	45 Aquarii.....	DD	1 45 38.5	9 40 57.7	f	115	R.	12-inch	Observation good; not over $0^s.1$ late.
1907									
Feb. 22	15 Geminorum.....	DD	8 24 27.4	10 16 57.5	e	115	Fn.	12-inch	

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OCCULTATIONS—Continued.

DATE.	OBJECT.	PHENOM.	WASHINGTON TIME		SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
			SIDEREAL.	MEAN.					
1907			h m s	h m s					
Feb. 22	16 Geminorum.....	DD	8 22 31.1	10 15 1.5	e	115	Fn.	12-inch	
22	16 Geminorum.....	RB	9 39 44.2	11 32 1.9	e	115	Fn.	12-inch	Poor observation.
Mar. 22	ζ Geminorum.....	DD	12 1 2.0	12 2 51.3	..	115	Fn.	12-inch	Sky thick.
24	∂ Cancri.....	DD	10 51 37.2	10 45 46.0	g	335	Fn.	12-inch	
24	∂ Cancri.....	RB	12 5 16.3	11 59 13.1	g	335	Fn.	12-inch	
Sept. 14	ξ Ophiuchi.....	DD	19 45 9.8	8 13 43.0	e	175	Fn.	26-inch	After bright star had disappeared a faint companion of about 10.5 mag. became visible.
14	ξ Ophiuchi.....	DD	19 45 14.3	8 13 47.5	e	175	Fn.	26-inch	
Oct. 24	Mayer 198.....	DB	0 53 31.2	10 43 57.6	f	115	Fn.	12-inch	Poor observation; limb unsteady.
24	Mayer 198.....	RD	2 1 17.0	11 51 32.3	f	115	Fn.	12-inch	
24	107 Tauri.....	DB	2 46 30.2	12 36 38.1	g	160	Fn.	12-inch	
24	107 Tauri.....	RD	4 2 59.0	13 52 54.4	g	160	Fn.	12-inch	
Nov. 16	Lalande 2632.....	DD	4 2 14.9	12 21 44.5	g	375	Hd.	26-inch	Double star.
16	Companion.....	DD	4 2 43.0	12 22 12.5	g	375	Hd.	26-inch	
16	Lalande 2632.....	DD	4 2 15.0	12 21 44.6	g	160	Fn.	12-inch	Star too faint to observe emersion.
Dec. 11	B. D.—10° 6120..	DD	1 45 48.5	8 27 22.7	..	...	Fk.	12-inch	

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PHENOMENA OF SATELLITES OF JUPITER AND SATURN.

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SATELLITE I.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
		h m s					
1895 Mar. 6	Eclipse, Reappearance	8 19 37	..	...	F.	9.6-inch	
22	Eclipse, Reappearance	6 40 2	..	...	F.	9.6-inch	
Apr. 5	Eclipse, Reappearance	10 32 41	..	...	F.	9.6-inch	
1896 Feb. 7	Eclipse, Reappearance	9 13 26	..	...	F.	12-inch	
21	Eclipse, Reappearance	13 2 28	..	...	F.	12-inch	Recorded as occultation.
Mar. 24	Eclipse, Reappearance	9 40 37	..	...	B.	12-inch	
Dec. 16	Eclipse, Disappearance	13 20 5	..	...	F.	12-inch	
1897 Apr. 19	Eclipse, Reappearance	12 45 36	..	...	F.	12-inch	First appearance of light.
Nov. 3	Eclipse, Disappearance	16 2 52	..	...	F.	12-inch	
1898 Jan. 18	Eclipse, Disappearance	18 19 24	..	...	F.	12-inch	
Feb. 3	Eclipse, Disappearance	16 33 2	..	...	F.	12-inch	
28	Eclipse, Disappearance	11 9 4	..	...	F.	12-inch	Somewhat cloudy.
Mar. 7	Eclipse, Disappearance	13 2 58	..	...	F.	12-inch	
14	Eclipse, Disappearance	14 56 0	..	...	F.	12-inch	
Apr. 8	Eclipse, Reappearance	11 44 26	..	...	F.	12-inch	Moonlight and haze.
May 17	Eclipse, Reappearance	10 12 52	..	...	F.	12-inch	
July 18	Eclipse, Reappearance	8 58 6	..	...	F.	12-inch	Hazy; probably late.
1899 May 13	Eclipse, Reappearance	11 7 3	..	...	F.	12-inch	Observation somewhat uncertain.
1902 Dec. 27	Transit, Ingress	7 10 46	..	115	K.	12-inch	Very poor; planet's limb unsteady.
1903 July 14	Occultation, Reappearance	14 14 52	p	235	K.	12-inch	Unsteady; poor definition.
21	Eclipse, Disappearance	12 42 17	..	235	K.	12-inch	
21	Occultation, Reappearance	16 4 7	..	335	K.	12-inch	
29	Transit, Egress	15 1 30	..	115	K.	12-inch	Clouds.
Aug. 7	Transit, Egress	11 17 0	p	235	K.	12-inch	
21	Transit, Ingress	12 32 43	p–f	335	K.	12-inch	Unsteady.
21	Transit, Egress	14 45 37	f	335	K.	12-inch	Unsteady; poor definition.
22	Eclipse, Disappearance	9 17 48	..	...	Hd.	12-inch	Unsteady.
22	Occultation, Reappearance	12 3 27	..	...	Hd	12-inch	Unsteady; poor observation.
Sept. 21	Occultation, Disappearance	11 8 46	g	335	K.	12-inch	Unsteady.
21	Eclipse, Reappearance	13 39 21	p	335	K.	12-inch	Unsteady.
22	Transit, Ingress	8 18 52	f	235	K.	12-inch	Unsteady.
22	Transit, Egress	10 32 13	g	235	K.	12-inch	Unsteady.

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		INSTRUMENT.	REMARKS.
		12-inch	
		12-inch	Unsteady; poor definition.
		12-inch	
		12-inch	
		12-inch	Unsteady; bad definition.
		12-inch	
		12-inch	
		12-inch	
		12-inch	
	K.	12-inch	Very unsteady.
	K.	12-inch	Thin clouds.
	K.	12-inch	
	R.	12-inch	
	R.	12-inch	
	R.	12-inch	Internal contact.
	R.	12-inch	Satellite "half off."
	R.	12-inch	External contact.
235	R.	12-inch	Internal contact.
235	R.	12-inch	Shadow "half off."
235	R.	12-inch	External contact.
235	R.	12-inch	Internal contact.
235	R.	12-inch	Satellite "half off."
235	R.	12-inch	External contact.
235	R.	12-inch	Shadow "half on"; unsteady.
235	R.	12-inch	Internal contact.
235	R.	12-inch	External contact; unsteady.
235	R.	12-inch	Satellite "half on."
235	R.	12-inch	Internal contact.
100	Fn.	12-inch	External contact.
100	Fn.	12-inch	Internal contact.
100	Fn.	12-inch	Internal contact.
100	Fn.	12-inch	External contact.
235	R.	12-inch	External contact.
235	R.	12-inch	Satellite "half gone."
235	R.	12-inch	Completely occulted.
235	Fn.	12-inch	External contact.
235	Fn.	12-inch	Satellite "half on."
235	Fn.	12-inch	Internal contact.
	Fn.	12-inch	External contact.
	Fn.	12-inch	Satellite "half gone."
	Fn.	12-inch	Completely occulted.
	Fn.	12-inch	External contact.
	Fn.	12-inch	Satellite "half on."
	Fn.	12-inch	Internal contact.
	Fn.	12-inch	Shadow "half on."
	Fn.	12-inch	Internal contact.

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SATELLITE I—Continued.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904		h m s					
Oct. 26	Transit, Egress	10 41 47	p	160	Fn.	12-inch	Internal contact.
26		10 44 23	p	160	Fn.	12-inch	Satellite "half off."
26		10 46 25	p	160	Fn.	12-inch	External contact.
26	Transit of Shadow, Egress	10 54 0	p	160	Fn.	12-inch	Internal contact.
26		10 55 9	p	160	Fn.	12-inch	Shadow "half off."
Nov. 1	Occultation, Disappearance	13 1 14	g	115	Fn.	12-inch	External contact.
1		13 4 0	g	115	Fn.	12-inch	Satellite "half gone."
1		13 6 54	g	115	Fn.	12-inch	Completely occulted.
1	Eclipse, Reappearance	15 38 29	g	115	Fn.	12-inch	First appearance; it was about 5 minutes before the satellite attained full brilliancy. Recorded W. M. T. increased 2^h.
2	Transit, Ingress	10 14 52	g	115	Fn.	12-inch	External contact.
2		10 17 21	g	115	Fn.	12-inch	Satellite "half on."
2		10 19 4	g	115	Fn.	12-inch	Internal contact.
2	Transit, Egress	12 25 30	g	115	Fn.	12-inch	Internal contact.
2		12 27 50	g	115	Fn.	12-inch	Satellite "half off."
2		12 29 52	g	115	Fn.	12-inch	External contact.
2	Transit of Shadow, Ingress	10 41 11	g	115	Fn.	12-inch	Shadow "half on."
2		10 44 20	g	115	Fn.	12-inch	Internal contact.
9	Transit, Ingress	11 59 44	f	235	Fn.	12-inch	External contact.
9		12 2 21	f	235	Fn.	12-inch	Satellite "half on."
9		12 4 14	f	235	Fn.	12-inch	Internal contact.
16	Transit, Ingress	13 43 47	..	235	Fn.	12-inch	External contact.
16		13 46 37	..	235	Fn.	12-inch	Satellite "half on."
16		13 49 53	..	235	Fn.	12-inch	Internal contact.
16	Transit of Shadow, Ingress	14 32 2	..	235	Fn.	12-inch	Shadow "half on."
16		14 33 44	..	235	Fn.	12-inch	Internal contact.
18	Transit, Egress	10 21 22	g	235	Fn.	12-inch	Internal contact.
18		10 23 26	g	235	Fn.	12-inch	Satellite "half off."
18		10 25 47	g	235	Fn.	12-inch	External contact.
18	Transit of Shadow, Egress	11 6 15	g	235	Fn.	12-inch	Internal contact.
18		11 8 37	g	235	Fn.	12-inch	Shadow "half off."

SATELLITE II.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1895		h m s					
Mar. 5	Eclipse, Reappearance	11 5 6	..	...	F.	9.6-inch	
1897							
Mar. 31	Eclipse, Reappearance	11 23 8	..	...	F.	12-inch	
1898							
Feb. 3	Eclipse, Disappearance	12 46 42	..	...	F.	12-inch	
Mar. 7	Eclipse, Disappearance	12 29 47	..	...	F.	12-inch	
14	Eclipse, Disappearance	15 5 38	..	...	F.	12-inch	
25	Eclipse, Reappearance	9 33 52	..	...	F.	12-inch	Saw it first at this time right on edge of planet.
Apr. 8	Eclipse, Reappearance	14 44 34	..	...	F.	12-inch	First seen at this time; moonlight and haze.

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SATELLITE II—Continued.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1899		h m s					
Aug. 1	Eclipse, Disappearance	7 3 8	..	...	See	12-inch	Doubtful by 10ˢ.
1	Eclipse, Reappearance	9 17 23	..	...	See	12-inch	Doubtful by 3ˢ.
1903							
July 20	Transit, Ingress	15 53 42	..	...	K.	12-inch	
Aug. 7	Transit, Egress	12 25 12	p	235	K.	12-inch	Recorded W. M. T. increased 1ʰ.
21	Transit, Ingress	14 27 36	f	335	K.	12-inch	Unsteady.
23	Occultation, Reappearance	11 29 22	g	...	Hd.	12-inch	
Sept. 22	Transit, Ingress	12 37 23	p	335	K.	12-inch	Unsteady.
22	Transit, Egress	15 13 28	p	335	K.	12-inch	
24	Eclipse, Reappearance	10 9 2	f	115	K.	12-inch	
29	Transit, Ingress	14 52 18	f	335	K.	12-inch	
Oct. 19	Eclipse, Reappearance	7 15 16	f	196	K.	12-inch	
26	Eclipse, Reappearance	9 51 9	g	235	K.	12-inch	
Nov. 2	Occultation, Disappearance	7 35 47	g	...	K.	12-inch	
2	Eclipse, Reappearance	12 28 41	g	...	K.	12-inch	Hazy.
4	Transit, Egress	5 20 58	p	235	K.	12-inch	Poor observation.
9	Occultation, Disappearance	10 0 58	g	235	K.	12-inch	
1904							
Jan. 5	Occultation, Disappearance	7 2 56	g	235	Hd.	12-inch	Last contact; very unsteady.
July 29	Eclipse, Reappearance	16 4 23	f	...	R.	12-inch	Possibly 8ˢ or 10ˢ late.
29	Occultation, Disappearance	16 29 3	f	...	R.	12-inch	Time probably correct within ½ minute.
Oct. 1	Eclipse, Disappearance	12 56 22	f	160	R.	12-inch	Total disappearance.
3	Transit of Shadow, Egress	9 54 40	f–p	235	R.	12-inch	Last contact.
3	Transit, Egress	10 39 56	f–p	235	R.	12-inch	
10	Transit, Ingress	10 33 39	..	235	R.	12-inch	External contact; unsteady.
10		10 35 39	..	235	R.	12-inch	Satellite "half on."
10		10 39 14	..	235	R.	12-inch	Internal contact.
17	Transit, Ingress	12 42 50	e	160	Fn.	12-inch	External contact.
17		12 50 52	e	160	Fn.	12-inch	Internal contact.
17	Transit, Egress	15 6 ..	e	160	Fn.	12-inch	Internal contact.
17		15 11 ..	e	160	Fn.	12-inch	External contact.
19	Occultation, Disappearance	7 15 59	p	235	Fn.	12-inch	External contact.
19		7 19 5	p	235	Fn.	12-inch	Satellite "half gone."
19		7 22 36	p	235	Fn.	12-inch	Completely occulted.
24	Transit, Ingress	15 1 13	f	...	Fn.	12-inch	External contact.
24		15 6 46	f	...	Fn.	12-inch	Satellite "half on."
24		15 9 11	f	...	Fn.	12-inch	Internal contact.
24	Transit of Shadow, Ingress	15 25 14	f	...	Fn.	12-inch	Shadow "half on."
24		15 27 44	f	...	Fn.	12-inch	Internal contact.
26	Eclipse, Reappearance	12 19 7	p	160	Fn.	12-inch	Satellite half eclipsed.
26		12 21 9	p	160	Fn.	12-inch	Satellite attained full brilliancy at this time.

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SATELLITE II—Continued.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1904		h m s					
Nov. 2	Occultation, Disappearance.....	11 42 13	g	115	Fn.	12-inch	
2		11 44 19	g	115	Fn.	12-inch	
2		11 47 34	g	115	Fn.	12-inch	
11	Transit of Shadow, Ingress.....	10 0 14	p	235	Fn.	12-inch	Shadow "half on."
11		10 3 29	p	235	Fn.	12-inch	Internal contact.
11	Transit of Shadow, Egress.....	12 20 15	p	235	Fn.	12-inch	Internal contact.
11		12 23 21	p	235	Fn.	12-inch	Shadow "half off."
11	Transit, Egress.....	11 3 29	p	235	Fn.	12-inch	Internal contact.
11		11 6 41	p	235	Fn.	12-inch	Satellite "half off."
11		11 10 13	p	235	Fn.	12-inch	External contact.
18	Transit, Ingress.....	11 1 19	g	235	Fn.	12-inch	External contact.
18		11 4 37	g	235	Fn.	12-inch	Satellite "half on."
18		11 8 14	g	235	Fn.	12-inch	Internal contact.
18	Transit, Egress.....	13 24 25	g	235	Fn.	12-inch	Internal contact.
18		13 27 35	g	235	Fn.	12-inch	Satellite "half off."
18		13 31 4	g	235	Fn.	12-inch	External contact.
18	Transit of Shadow, Ingress.....	12 38 49	g	235	Fn.	12-inch	Shadow "half on."
		12 42 3	g	235	Fn.	12-inch	Internal contact.

SATELLITE III.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1895		h m s					
Apr. 17	Eclipse, Disappearance.....	7 59 3	..	...	F.	9.6-inch	Last glimpse of satellite.
17	Eclipse, Reappearance.....	10 58 32	..	...	F.	9.6-inch	First glimpse of satellite.
1896							
Mar. 26	Eclipse, Disappearance.....	7 0 53	..	...	F.	12-inch	
26	Eclipse, Reappearance.....	10 32 43	..	...	F.	12-inch	
Dec. 16	Eclipse, Reappearance.....	13 47 42	..	...	F.	12-inch	
1897							
Apr. 24	Eclipse, Disappearance.....	9 51 32	..	...	F.	12-inch	This was the time of last disappearance of the light of the satellite.
1898							
Feb. 26	Eclipse, Disappearance.....	12 54 58	..	...	F.	12-inch	
1899							
Mar. 20	Eclipse, Disappearance.....	11 46 1	..	...	F.	12-inch	
20	Eclipse, Reappearance.....	13 24 2	..	...	F.	12-inch	
1902							
Oct. 1	Eclipse, Reappearance.....	11 47 21	..	...	K.	12-inch	Unsteady.
Dec. 1	Transit, Egress.....	5 5 34	g	235	K.	12-inch	
8	Transit, Ingress.....	5 54 4	g	235	K.	12-inch	
1903							
Sept. 28	Transit, Egress.....	8 29 29	g	235	K.	12-inch	Recorded W. M. T. decreased 1^h.
Oct. 12	Transit, Ingress.....	12 3 34	p	235	K.	12-inch	
Nov. 6	Occultation, Disappearance.....	12 25 26	p	235	K.	12-inch	Very unsteady.

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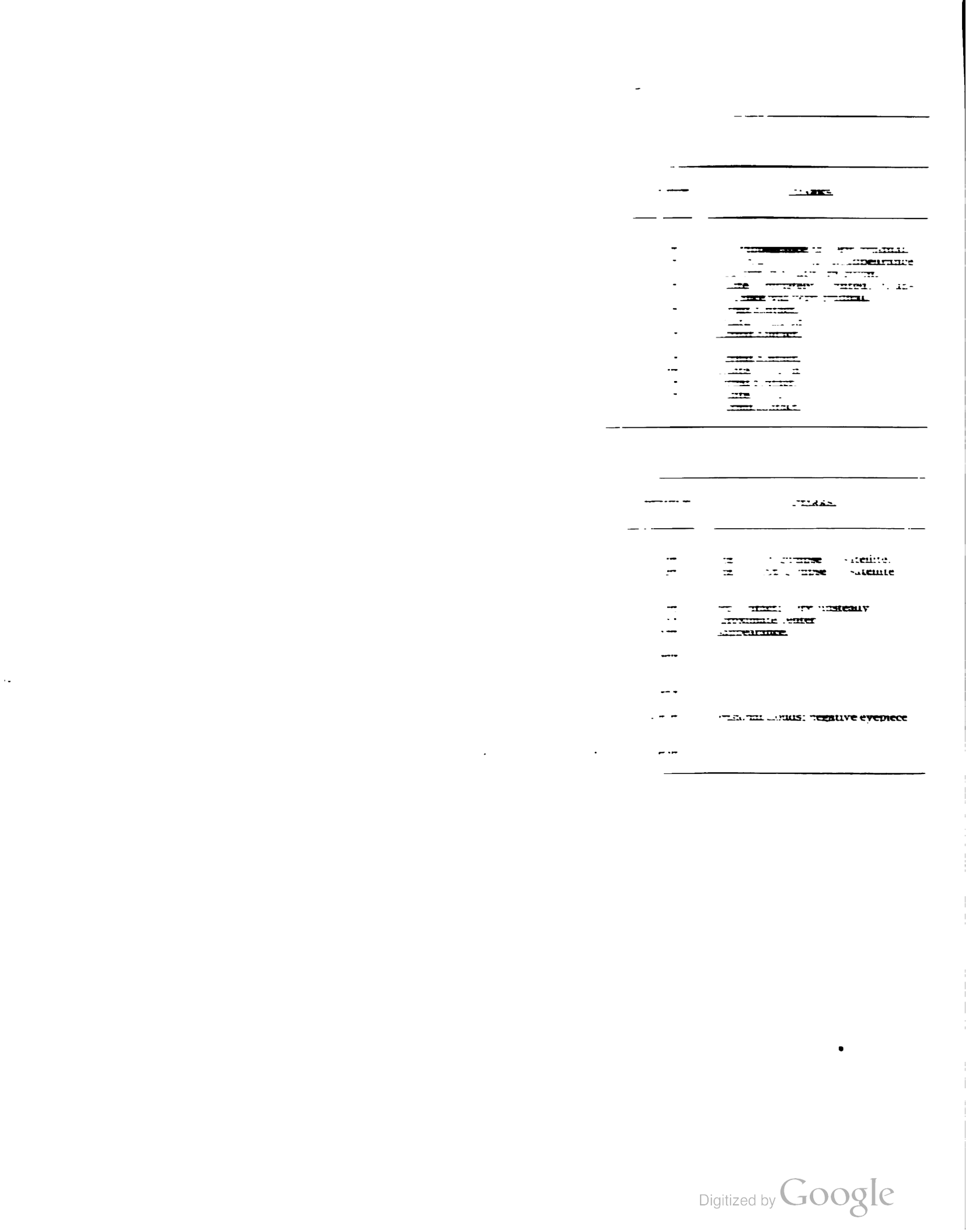

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TETHYS.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907		h m s					
Nov. 11	Eclipse, Reappearance.....	6 9 22	p	400	Hd.	26-inch	First seen.
11		6 11 17	p	400	Hd.	26-inch	Entirely out of shadow.
11	Eclipse, Reappearance.....	6 10 9	p	235	P.	12-inch	Satellite probably half out.

DIONE.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907		h m s					
Dec. 12	Eclipse, Reappearance.....	7 5 52	b	...	P.	26-inch	Observation uncertain.

RHEA.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907		h m s					
Nov. 16	Eclipse, Reappearance.....	5 50 38	e	400	Hd.	26-inch	Partly out.
16		5 51 58	e	400	Hd.	26-inch	As bright as Tethys.
16		5 53 58	e	400	Hd.	26-inch	Probably entirely out of shadow.
16	Eclipse, Reappearance.....	5 50 26	g	235	P.	12-inch	First seen.
16		5 55 11	g	235	P.	12-inch	As bright as Tethys.
16		5 57 56	g	235	P.	12-inch	Perhaps out of shadow.
16		5 58 41	g	235	P.	12-inch	Certainly out of shadow.
25	Eclipse, Reappearance.....	6 46 45	f	400	Hd.	26-inch	First seen.
25		6 47 35	f	400	Hd.	26-inch	As bright as Enceladus.
25		6 48 35	f	400	Hd.	26-inch	As bright as Dione.
25		6 49 35	f	400	Hd.	26-inch	Entirely out of shadow.
25	Eclipse, Reappearance.....	6 47 27	p	235	P.	12-inch	First seen; uncertain.
25		6 49 47	p	235	P.	12-inch	A little brighter than Dione.
25		6 55 18	p	235	P.	12-inch	Certainly out of shadow.

TITAN.

DATE.	PHENOMENA.	WASHINGTON MEAN TIME.	SEEING.	POWER.	OBS'R.	INSTRUMENT.	REMARKS.
1907		h m s					
Aug. 25	Eclipse, Disappearance.....	15 56 21	f	...	Hd.	26-inch	

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OBSERVATIONS OF MISCELLANEOUS STARS.

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2387 GEMINORUM (TURNER'S NOVA).

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1903.0)	$\Delta\delta$ (1903.0)	α (1903.0)	δ (1903.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1903	h m s	m s	′ ″	h m s	° ′ ″				
Mar. 31	7 25 ..	+1 17.53	−2 20.9	6 38 0.54	+30 2 28.7	1	29, 6	Fk.	26-inch

MEAN PLACE OF THE COMPARISON STAR FOR THE BEGINNING OF THE YEAR.

STAR.	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	6 36 43.01	+30 4 49.6	½ (Leiden, A. G. 2783+Camb., Eng., A. G. 3447)	

B. D. −14° 3748.

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1905.0)	$\Delta\delta$ (1905.0)	α (1905.0)	δ (1905.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″				
June 26	9 26 ..	+2 37.09	−6 23.7	13 30 24.12	−14 58 52.7	1	19, 4	Fn.	26-inch
26	9 46 ..	−1 56.57	+7 43.2	13 30 23.95	−14 58 50.6	2	18, 4	Fn.	" "
26	10 4 ..	−2 27.93	−9 37.5	13 30 23.96	−14 58 50.1	3	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	13 27 47.03	−14 52 29.0	Washington, A. G. 5110	
2	13 32 20.52	−15 6 33.8	" " 5133	
3	13 32 51.89	−14 49 12.6	" " 5135	Est. mag. is 9.5.

B. D. −15° 3708.

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1905.0)	$\Delta\delta$ (1905.0)	α (1905.0)	δ (1905.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″				
June 17	10 11 ..	+3 20.77	+1 47.4	13 32 55.07	−16 13 45.9	1	30, 6	Fn.	26-inch
18	9 3 ..	−1 39.53	−3 11.9	13 32 55.09	−16 13 45.5	2	19, 4	Fn.	" "
18	9 29 ..	+2 33.52	+7 41.1	13 32 55.15	−16 13 46.4	3	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	13 29 34.30	−16 15 33.3	Washington, A. G. 5119	
2	13 34 34.62	−16 10 33.6	" " 5144	Est. mag. is 9.0.
3	13 30 21.63	−16 21 27.5	" " 5122	

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B. D. – 16° 3735.

DATE	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1905.0)	$\Delta\delta$ (1905.0)	α 1905.0	δ (1905.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1905	h m s	m s	′ ″	h m s	° ′ ″				
June 21	11 2	−0 56.09	+2 15.4	13 39 17 58	−16 43 48 4	1	30.6	Fn.	26-inch
25	9 20	+1 51.28	+3 47 9	13 39 17 51	−16 43 46 0	2	25.5	Fn.	" "
25	9 46	+2 45.62	+6 52.6	13 39 17 49	−16 43 48 1	3	25.5	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR	α	δ	AUTHORITY.	REMARKS
	h m s	° ′ ″		
1	13 40 13.67	−16 46 3 8	Washington, A. G. 5158	
2	13 37 26 23	−16 47 33 9	" " 5157	
3	13 36 31 87	−16 50 40.7	" " 5151	Est. mag. is 9.2.

B. D. – 15° 4143.

DATE	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1904.0)	$\Delta\delta$ (1904.0)	α 1904.0	δ 1904.0	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1904	h m s	m s	′ ″	h m s	° ′ ″				
Mar. 16	14 52	+3 30 16	+ 2 37.6	15 32 23 23	−15 50 58 3	1	25.5	Hd.	12-inch
16	15 20	+3 27 89	+12 27.9	15 32 23.28	−15 51 0 3	2	25.5	Hd.	" "
16	15 48	+1 51.19	−11 52.1	15 32 23 33	−15 50 59.1	3	23.5	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	15 28 53 07	−15 53 35 9	Washington, A. G. 5706	Seeing good.
2	15 28 55 39	−16 3 28 2	" " 5707	Est. mag. is 10.0.
3	15 30 32 14	−15 39 7 0	" " 5713	

B. D. – 15° 4208.

DATE	WASHINGTON MEAN TIME	$\Delta\alpha$ 1905.0)	$\Delta\delta$ 1905.0)	α (1905.0)	δ (1905.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT
1905	h m s	m s	′ ″	h m s	° ′ ″				
June 27	10 38	−6 40 19	−3 43 9	15 48 13 10	−15 57 14.1	1	20.4	Fn.	26-inch
27	11 36	−5 37 01	−0 12 4	15 48 13.12	−15 57 13.8	2	20.4	Fn.	" "
27	12 7	−1 23 01	+7 36 0	15 48 13 06	−15 57 13 6	3	20.4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	15 54 53 29	−15 53 30 2	Washington, A. G. 5836	
2	15 53 50 13	−15 57 1 4	" " 5834	
3	15 49 36 07	−16 4 49 6	" " 5804	Est. mag. is 9.9.

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B. D. − 15° 4338.

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1904.0)	$\Delta\delta$ (1904.0)	α (1904.0)	δ (1904.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1904	h m s	m s	′ ″	h m s	° ′ ″				
Apr. 1	15 34 ..	+4 9.41	+0 56.5	16 28 14.47	−15 55 44.1	1	20, 4	Hd.	12-inch
1	15 53 ..	+1 4.74	−8 58.2	16 28 14.37	−15 55 43.0	2	25, 4	Hd.	" "
2	15 22 ..	−1 37.77	+8 20.8	16 28 14.36	−15 55 43.1	3	20, 4	Hd.	" "
2	15 36 ..	−2 22.20	−2 21.3	16 28 14.36	−15 55 43.4	4	15, 3	Hd.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	16 24 5.06	−15 56 40.6	Washington, A. G. 5951	Est. mag. is 8.5.
2	16 27 9.63	−15 46 44.8	" " 5963	Seeing very poor; clouded over.
3	16 29 52.13	−16 4 3.9	" " 5974	
4	16 30 36.56	−15 53 22.1	" " 5977	Clouded over.

B. D. − 15° 4857.

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1905.0)	$\Delta\delta$ (1905.0)	α (1905.0)	δ (1905.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1905	h m s	m s	′ ″	h m s	° ′ ″				
July 25	10 14 ..	+2 41.58	−2 16.2	18 6 24.68	−15 6 42.6	1	20, 4	Fn.	26-inch
26	9 33 ..	−0 32.29	+5 16.2	18 6 24.83	−15 6 42.1	2	19, 4	Fn.	" "
26	9 50 ..	−1 4.86	+6 14.4	18 6 24.78	−15 6 42.7	3	20, 4	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	18 3 43.10	−15 4 26.4	Washington, A. G. 6551	
2	18 6 57.12	−15 11 58.3	" " 6591	
3	18 7 29.64	−15 12 57.1	" " 6600	Est. mag. is 9.4.

B. D. − 15° 5795.

DATE.	WASHINGTON MEAN TIME.	$\Delta\alpha$ (1907.0)	$\Delta\delta$ (1907.0)	α (1907.0)	δ (1907.0)	STAR.	NO. COMP.	OBS'R.	INSTRUMENT.
1907	h m s	m s	′ ″	h m s	° ′ ″				
Aug 11	10 45 ..	+0 30.52	−7 0.7	20 42 57.83	−15 7 33.3	1	25, 5	Fn.	26-inch
11	11 8 ..	−2 29.05	+1 17.7	20 42 57.83	−15 7 32.7	2	15, 3	Fn.	" "
11	11 24 ..	+1 58.10	−3 28.8	20 42 57.85	−15 7 33.2	3	15, 3	Fn.	" "

MEAN PLACES OF THE COMPARISON STARS FOR THE BEGINNING OF THE YEAR.

STAR.	α	δ	AUTHORITY.	REMARKS.
	h m s	° ′ ″		
1	20 42 27.31	−15 0 32.6	Washington, A. G. 7826	
2	20 45 26.88	−15 8 50.4	" " 7847	
3	20 40 59.75	−15 4 4.4	" " 7817	Est. mag. is 11.8.

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NOVA PERSEI.

DATE.	WASHINGTON MEAN TIME.	OBS'R.	INSTRUMENT.	REMARKS.
1901	h m			
Feb. 23	8 5	See	26-inch	Examined with power 400. Entirely stellar in character and no near companion. Field dark and stars very small, magnitude 14. Brightness of Nova 0.3 magnitude fainter than α Aurigæ. Color is a light yellow, not quite so blue as β Orionis.
23	8 5	Updegraff	" "	Nova is same magnitude as α Aurigæ.
23	8 5	Br.	" "	Nova is a trifle fainter than α Aurigæ.
24	9 0	Br.	" "	Nova is 0.5 magnitude fainter than α Aurigæ.
24	9 0	See	" "	Nova is 0.3 magnitude fainter than α Aurigæ.
25	7 10	See	" "	Field about stars is perfectly dark. As seen with the naked eye, the Nova is the same color as β Geminorum and of about the same brightness. It is a whole magnitude fainter than α Aurigæ. It is about the same color as α Aurigæ and perhaps a little more reddish.
26	7 0	See	" "	The magnitude of the Nova is 1.5 or 1.4. It is deep orange in color, redder than α Aurigæ. Clouds.
26	8 20	Br.	" "	Nova is 0.5 magnitude brighter than α Persei.
26	8 20	See	" "	Nova is 0.4 magnitude brighter than α Persei and 0.3 magnitude fainter than β Geminorum. It is the same color as the latter star.
27	6 35	See	" "	Nova is 0.1 magnitude brighter than α Persei. It is reddish like β Geminorum, redder than α Aurigæ. Magnitude carefully estimated.
28	8 0	See	" "	Nova is 0.1 magnitude fainter than α Persei. Professor Brown confirms.
Mar. 1	.. ..	Br.	" "	Nova is 0.3 magnitude fainter than α Persei. It is decidedly red in color.
1	.. ..	See	" "	Nova is 0.4 magnitude fainter than α Persei. In color it is somewhat redder han α Tauri, nearly as red as α Scorpii.
15	9 10	See	" "	Nova is of the same brightness as κ Persei and ν Persei, which appear of equal luster. In color, the Nova is reddish. Sky hazy.
16	7 0	See	" "	Nova is 0.2 magnitude fainter than κ Persei and ν Persei. It is exceedingly red with a brilliant red envelope. Have not observed this phenomenon before. This same phenomenon was noticed by Mr. L. G. Hoxton on March 14. The seeing is poor.
17	8 10	See	" "	Nova is 0.1 magnitude brighter than κ Persei and ν Persei. This is a careful estimate.
18	7 36	See	" "	Nova is 0.2 magnitude fainter than κ Persei and ν Persei.
21	9 10	See	" "	Nova is 0.4 magnitude fainter than κ Persei and ν Persei.
22	7 5	See	" "	Nova is 0.7 magnitude fainter than κ Persei and ν Persei.
24	9 20	See	" "	Nova is 1.0 magnitude fainter than κ Persei and ν Persei.
26	9 20	See	" "	Nova is 0.9 magnitude fainter than κ Persei and ν Persei.
28	9 10	See	" "	Nova is 1.1 magnitudes fainter than κ Persei and ν Persei.
29	9 15	See	" "	Nova is 1.2 magnitudes fainter than κ Persei and ν Persei. It appears to be surrounded by a crimson halo, as on previous occasions. The field is dark and no nebulosity is visible.
31	8 42	See	" "	Nova is 0.8 magnitude fainter than κ Persei and ν Persei. Sky very clear.
Apr. 4	7 31	See	" "	Nova is 0.4 magnitude fainter than κ Persei and ν Persei. It is certainly brighter than it was several days ago.
11	8 32	See	" "	Nova is deep red, more than crimson. The field about the star is perfectly dark; no nebulosity visible. It is 2.0 magnitudes fainter than κ Persei and ν Persei; barely visible to the naked eye. Its absolute magnitude is about 6.4. Sky is clear.
17	.. ..	See	" "	Nova is 1.2 magnitudes fainter than κ Persei and ν Persei. Its absolute magnitude is about 5.6 It is not quite so red in color as at the last observation; in fact, it is orange color now. There is no trace of nebulosity visible. Seeing is good.

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NOVA PERSEI—Continued.

DATE.	WASHINGTON MEAN TIME.	OBS'R.	INSTRUMENT.	REMARKS.
1901 Nov. 13	h m 10 55	See	26-inch	Nova has a sea-green appearance like Neptune; no trace of red. There is a faint nebulosity extending outward at least 30″, exactly resembling the outskirts of the Orion nebula in tint and appearance. The nebulosity is apparently symmetrical about the Nova and fades away gradually. Seeing fair.
13	13 30	See	" "	Compared the Nova with other stars of the same color and also with stars of different colors. The nebulosity is apparently real, and not due to the light of the field. The brightness of the comparison stars was about the same. The "Orion appearance" of the Nova is striking.

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OBSERVATIONS OF THE TRANSITS OF MERCURY

OF

NOVEMBER 10, 1894, AND NOVEMBER 13, 1907.

28167°—VOL 6—11——25 A 385

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TRANSIT OF MERCURY OF NOV. 10, 1894.

OBSERVER.	APERTURE.	POWER.	WASHINGTON MEAN TIME. FIRST CONTACT.	SECOND CONTACT.	THIRD CONTACT.	FOURTH CONTACT.	REMARKS.
			h m s	h m s	h m s	h m s	
Newcomb	5 inches	150±	22 48 51.	.. ..	.. .. ..	.. .. ..	Transit-of-Venus equatorial used. Planet first seen; contact probably past by 20 seconds or more.
				22 50 0.	.. .. ..	.. .. ..	Good, no well-marked distortion; Sun's limb diffused.
				22 50 6.	.. .. ..	.. .. ..	Planet seemed wholly within the Sun, but thread of light still invisible.
				22 50 11.	.. .. ..	.. .. ..	Light began to form around outer edge of the planet, which, however, now seemed well within the Sun's disk.
							The observations were deficient owing to the telescope being shaken by the wind, which may have prevented my catching the first formation of the thread of light. Otherwise the conditions were good and the phases seemed certain within 3 seconds. The moment $22^h\ 50^m\ 3^s$ W. M. T. may be taken as that of second mean contact as usually observed.
Eastman	3.5 inches	70	.. ..	22 50 0.9	.. .. ..	.. .. ..	Telescope equatorially mounted, on southeast corner of platform around the dome of the 9.6-inch equatorial. At first contact telescope so shaken by wind that no attempt was made to observe the time. Second contact, telescope still shaken by wind; probably a little late. No indication of black drop.
Frisby	9.6 inches	..	22 49 4.2	22 49 45.2	.. .. ..	.. .. ..	Seeing bad at first contact, planet probably half on before it could be seen. Second contact very unsteady, but I thought I could barely see a rim of light around planet.
Brown	12 inches	..	22 48 28.1 22 48 36.5	22 50 12.4	.. .. ..	.. .. ..	26-inch equatorial used. Estimate made at the time of first contact that the planet was from $\frac{1}{8}$ to $\frac{1}{4}$ of its diameter on the disk, which makes a correction of $-\frac{1}{4}$ or $-\frac{1}{8}$ of $104^s.2 = 26^s.0$ or $17^s.6$, which was applied to the observed time.
Hill	2 inches	64	22 48 55.5	22 50 22.0	.. .. ..	.. .. ..	The 4-inch comet seeker with pink shade-glass was used. Computer E. A. Boeger was time recorder and counted aloud the seconds for two minutes before first contact and from first to second contact. Observations uncertain, since telescope was shaken by wind. The observed time of second contact was the instant when a ring of light encircled the planet. Saw no trace of the black drop. Third and fourth contacts lost because of clouds.

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TRANSIT OF MERCURY OF NOV. 13, 1907.

OBSERVER.	APERTURE.	POWER.	WASHINGTON MEAN TIME. FIRST CONTACT.	SECOND CONTACT.	THIRD CONTACT.	FOURTH CONTACT.	REMARKS.
			h m s	h m s	h m s	h m s	
Hammond	4 inches	120	.. .. ..	.. .. ..	20 40 1	20 42 33	Only the egress visible at Washington. Third and fourth contacts observed with 12-inch equatorial with polarizing eyepiece. Seeing was rather unsteady, especially just at time of third contact. Saw the black drop very conspicuously. This formed about 10 seconds before my recorded time of third contact. I waited these few seconds for geometrical contact, which was very difficult to observe, and my time for third contact is probably 10 seconds late. The fourth contact was pretty well observed and the error could not be more than 2 or 3 seconds. Mercury continually appeared as a dark opaque body while on the Sun's disk. Could not see it projected on the chromosphere between third and fourth contacts, though I looked particularly.
Frederickson	3 inches	60	.. .. ..	.. .. ..	20 39 48	20 42 11	Observed with the 5-inch comet seeker. (Alt-azimuth mounting.) Could not see any luminous band surrounding the planet just after third contact; neither could I see the planet's disk illuminated between third and fourth. Could see the black drop after third. The cusps were blunt. The Sun's limb was very unsteady, but the planet's disk was sharp and well defined before third contact.
Eichelberger	2 inches	..	.. .. ..	.. .. ..	20 39 51	20 42 21	Observed with 4-inch finder of 12-inch equatorial.
Hill	5 inches	75	.. .. ..	.. .. ..	20 39 49	20 42 29	At times a grayish illumination would come over the planet when it was about two of its diameters from the Sun's limb. $20^h\ 0^m$; illumination of grayish color on following side of Mercury. $20^h\ 5^m$; illumination still remains on following side. $20^h\ 20^m$; when the telescope is moved back and forth a fringe of grayish color comes out on preceding side. When the preceding half of Mercury was off the Sun's disk, that part showed no illumination nor could it be seen. Seeing unsteady. A diagonal solar eyepiece with shade-glass was used.

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APPENDIX I.

MISCELLANEOUS ASTRONOMICAL PAPERS.

BY

MEMBERS OF THE NAVAL OBSERVATORY STAFF.

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THE MASS OF TITAN.

BY

W. S. EICHELBERGER.

FROM

OBSERVATIONS OF HYPERION

MADE BY

ASAPH HALL IN 1884–1885.

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THE MASS OF TITAN.

In the Astronomical Journal, Nos. 259–260, the author published a discussion of a series of observations of Hyperion made at nine oppositions from 1875 to 1890 and computed a set of elements for each opposition. From these nine sets the perturbations of the elements of Hyperion's orbit, together with the mean values of the elements referred to the equinox of 1884.0, were empirically deduced as follows:

Elements I of Hyperion.

$$E = 295°.92 + 16°.92006\,t + 9°.05 \sin\left[48°.07 + \frac{360°}{639.5}t\right].$$

$$P = 8°.46 - 18°.442\,T + 14°.40 \sin \Pi - 1°.40 \sin 2\,\Pi + 1°.11 \sin 3\,\Pi.$$

$$\mu = 16°.92006 + 0°.08892 \cos\left[48°.07 + \frac{360°}{639.5}t\right].$$

$$e = 0.1056 + 0.0258 \cos \Pi + 0.0008 \cos 2\,\Pi.$$

t = time in days from Jan. 0.0, 1884.

T = time in years from 1884.0.

$\Pi = 263°.54 + 18°.942\,T.$

As the elements assumed in the article referred to differed quite widely from those deduced, a comparison of the observations from December 4, 1884, to January 29, 1885, was made with an ephemeris based upon the elements just given, and a new set of elements was computed as given below;

Elements II of Hyperion.

Epoch: January 0.0, 1885, Greenwich Mean Time.

	°	′
E =	359	35.6
P =	337	25.3
n =	169	22.2
i =	27	12.5

$e = 0.11143 = \sin 6°\ 23'.9$

$\mu = 16°.89572$

$\Delta = 214''.405$

This discussion was finished in 1893, when work on the subject was discontinued. An ocean voyage to Sumatra to observe the Total Solar Eclipse of May 17, 1901, offered some leisure and it was determined to compute the special perturbations of Hyperion by Titan, obtain osculating elements of Hyperion and a mass of Titan. During the voyage it was the author's good fortune to have associated with him in all the computations Prof. F. B. LITTELL, U. S. Navy, for whose valuable assistance

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he wishes to acknowledge his indebtedness. As no opportunity has presented itself since that time for continuing this work, it has been decided to publish what has already been done.

STRUVE'S elements of Titan in Supplement I, aux Observations de Poulkova, were used with the mean distance given by Prof. ASAPH HALL, jr., Transactions of the Astronomical Observatory of Yale University, Volume I, Part II, and the mass by Dr. GEO. W. HILL, Astronomical Journal, No. 176.

Elements of Titan.

Epoch: January 0.0, 1885, Greenwich Mean Time.

$$E = 74^\circ\ 46'.9$$
$$P = 272\ \ 27.1$$
$$n = 167\ \ 45.4$$
$$i = 27\ \ 28.3$$
$$e = 0.029073$$
$$\mu = 22^\circ.5770116$$
$$\Delta = 176''.570$$
$$m = \frac{1}{4714}$$

The special perturbations were computed by the method of the variation of the elements, and the interval employed was one day for about 6 days each side of opposition, ¼ day for about 3 days each side of conjunction, and ½ day for the remaining time. Starting from Jan. 0.0, 1885, the perturbations were computed for ten dates. These results were then integrated, the integrated values applied to the original elements, and the perturbations computed for another ten dates, of which three would coincide with three of the previous ten. This method was continued throughout the entire work.

Perturbations of the Elements of Hyperion by Titan.

Greenwich Mean Time.	$\Delta\mu$	ΔE	ΔP	$\Delta\varphi$	Δi	Δn
1884	′	′	° ′	′	′	′
Sept. 19.75	−2.564	+137.51	+5 19.7	+5.8	−0.6	+0.1
20.75	2.692	134.41	22.5	6.0	0.6	0.1
21.75	2.841	131.22	25.9	6.0	0.6	0.1
22.75	3.007	127.93	29.3	5.8	0.6	0.1
23.75	−3.184	+124.55	+5 32.0	+5.4	−0.6	+0.1
24.75	−3.369	+121.08	+5 33.6	+5.0	−0.6	+0.1
25.75	3.558	117.50	33.8	4.5	0.6	0.1
26.75	3.750	113.83	32.5	4.1	0.6	0.1
27.75	3.944	110.05	30.0	3.7	0.6	0.1
28.75	−4.139	+106.17	+5 26.5	+3.4	−0.6	+0.1
29.75	−4.331	+102.18	+5 22.5	+3.3	−0.6	+0.1
30.75	4.516	98.09	18.7	3.4	0.6	0.0
Oct. 1.75	4.686	93.92	15.9	3.7	0.6	0.0
2.75	4.832	89.66	14.6	4.0	0.6	0.0
3.75	−4.942	+ 85.34	+5 15.1	+4.4	−0.6	0.0
4.75	−5.005	+ 80.99	+5 17.3	+4.7	−0.6	0.0
5.75	5.017	76.65	20.5	4.7	0.6	0.0
6.75	4.977	72.37	23.7	4.6	0.6	0.0
7.75	4.886	68.19	26.1	4.2	0.6	0.0
8.75	−4.744	+ 64.19	+5 26.9	+3.8	−0.6	0.0

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Perturbations of the Elements of Hyperion by Titan—Continued.

Greenwich Mean Time.	$\Delta\mu$	ΔE	ΔP	$\Delta\varphi$	Δi	Δn
1884	′	′	° ′	′	′	′
Oct. 9.75	−4.545	+ 60.44	+5 25.4	+3.2	−0.6	0.0
10.75	4.277	57.03	21.2	2.6	0.6	+0.1
11.75	3.920	54.11	13.6	2.2	0.6	0.1
12.75	3.439	51.95	5 2.3	2.1	0.6	0.1
13.75	−2.786	+ 50.96	+4 46.6	+2.4	−0.6	+0.1
14.75	−1.960	+ 51.98	+4 25.7	+3.2	−0.6	+0.1
♂ 15.75	1.260	55.85	4 0.1	4.2	0.5	0.0
16.75	1.328	60.97	3 34.0	4.0	0.4	0.0
17.75	1.959	63.91	3 12.5	3.0	0.3	0.0
18.75	−2.538	+ 64.35	+2 56.8	+2.5	−0.3	0.0
19.75	−2.920	+ 63.36	+2 46.4	+2.4	−0.3	0.0
20.75	3.142	61.58	40.2	2.7	0.3	0.0
21.75	3.253	59.36	37.7	3.2	0.3	0.0
22.75	3.286	56.89	37.7	3.6	0.3	0.0
23.75	−3.267	+ 54.28	+2 39.5	+3.9	−0.3	0.0
24.75	−3.214	+ 51.63	+2 42.2	+4.0	−0.3	0.0
25.75	3.143	48.97	45.1	4.0	0.3	0.0
26.75	3.059	46.35	47.7	3.9	0.3	0.0
27.75	2.967	43.79	49.7	3.7	0.3	0.0
28.75	−2.862	+ 41.33	+2 50.8	+3.4	−0.3	0.0
29.75	−2.740	+ 38.97	+2 50.8	+3.1	−0.3	0.0
30.75	2.596	36.72	49.4	2.8	0.3	0.0
31.75	2.428	34.59	46.6	2.5	0.3	0.0
Nov. 1.75	2.238	32.56	42.8	2.4	0.3	0.0
2.75	−2.031	+ 30.66	+2 38.5	+2.5	−0.3	0.0
3.75	−1.814	+ 28.86	+2 34.7	+2.8	−0.3	+0.1
4.75	1.595	27.15	32.0	3.3	0.3	0.1
5.75	1.383	25.53	31.0	3.8	0.3	0.1
6.75	1.186	23.99	31.7	4.3	0.3	0.1
7.75	−1.011	+ 22.54	+2 33.7	+4.7	−0.3	+0.1
8.75	−0.862	+ 21.19	+2 36.7	+4.9	−0.3	+0.1
9.75	0.739	19.93	39.7	5.0	0.3	0.1
10.75	0.642	18.76	42.3	4.9	0.3	0.1
11.75	0.569	17.68	44.1	4.8	0.3	0.1
12.75	−0.516	+ 16.67	+2 45.0	+4.5	−0.3	+0.1
♀ 13.75	−0.481	+ 15.71	+2 44.8	+4.3	−0.3	+0.1
14.75	0.461	14.80	43.9	4.1	0.3	0.1
15.75	0.452	13.91	42.3	4.0	0.3	0.1
16.75	0.456	13.03	40.3	3.9	0.3	0.1
17.75	−0.472	+ 12.13	+2 38.2	+3.9	−0.3	+0.1
18.75	−0.503	+ 11.20	+2 36.3	+4.1	−0.3	+0.1
19.75	0.554	10.21	35.1	4.3	0.3	0.1
20.75	0.628	9.14	34.9	4.6	0.3	0.1
21.75	0.728	7.98	36.0	4.9	0.3	0.1
22.75	−0.855	+ 6.72	+2 38.3	+5.1	−0.3	+0.1
23.75	−1.004	+ 5.35	+2 41.6	+5.2	−0.3	+0.1
24.75	1.171	+ 3.89	45.3	5.1	0.3	0.1
25.75	1.351	+ 2.32	48.6	4.8	0.3	0.1
26.75	1.538	+ 0.65	51.1	4.5	0.3	0.1
27.75	−1.729	− 1.11	+2 52.4	+4.0	−0.3	+0.1
28.75	−1.922	− 2.98	+2 52.2	+3.5	−0.3	+0.1
29.75	2.115	4.94	50.5	3.1	0.3	0.1
30.75	2.307	7.02	47.6	2.7	0.3	0.1
Dec. 1.75	2.496	9.18	44.0	2.5	0.3	0.1
2.75	−2.677	− 11.43	+2 40.1	+2.5	−0.3	+0.1
3.75	−2.844	− 13.78	+2 36.7	+2.7	−0.3	+0.1
4.75	2.989	16.20	34.6	3.0	0.3	0.1
5.75	3.097	18.65	34.3	3.3	0.3	0.1
6.75	3.156	21.12	35.9	3.6	0.3	0.1
7.75	−3.156	− 23.57	+2 39.1	+3.8	−0.3	+0.1

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Perturbations of the Elements of Hyperion by Titan—Continued.

Greenwich Mean Time.	Δp	ΔE	ΔP	$\Delta \varphi$	Δi	Δn
1884	′	′	° ′	′	′	′
Dec. 8.75	−3.092	− 25.92	+2 42.9	+3.7	−0.3	+0.1
9.75	2.966	28.16	46.1	3.3	0.3	0.1
10.75	2.780	30.19	47.8	2.8	0.3	0.1
11.75	2.535	31.93	47.2	2.1	0.3	0.1
12.75	−2.220	− 33.30	+2 43.7	+1.4	−0.3	+0.1
13.75	−1.820	− 34.16	+2 36.6	+0.8	−0.3	+0.1
14.75	−1.300	34.28	2 25.5	0.4	0.3	0.1
15.75	−0.612	33.29	2 9 6	0.4	0.3	0.1
16.75	+0.277	30.47	1 48 0	0.9	0.3	0.1
17.75	+1.205	− 24.78	+1 20 8	+1.7	−0.2	+0.1
6						
18.75	+1.521	− 16 67	+0 52 3	+1.7	−0.2	0.0
19.75	+1.016	9.78	+0 28 8	+0 5	−0.1	0.0
20.75	+0.381	5.72	+0 11 5	−0 5	0.0	0.0
21.75	−0 068	3.52	−0 0 7	−0.9	0.0	0.0
22.75	−0.337	− 2.31	−0 8 6	−0.8	0.0	0.0
23.75	−0.474	− 1.63	−0 12.7	−0.4	0.0	0.0
24.75	0 521	1.26	13 8	0.0	0.0	0.0
25.75	0.504	1.06	12 6	+0 3	0.0	0.0
26.75	0.445	0.94	10.1	+0.6	0.0	0.0
27.75	−0.359	− 0.82	−0 7.1	+0.6	0.0	0.0
28.75	−0.259	− 0.66	−0 4.2	+0.5	0.0	0.0
29.75	−0.149	− 0.44	−0 1.9	+0.3	0.0	0.0
30.75	−0.031	− 0.10	−0 0.2	+0.1	0.0	0.0
31.75	+0.097	+ 0.30	+0 0 3	−0 2	0.0	0.0
1885						
Jan. 1.75	+0.241	+ 0.90	−0 0 4	−0 6	0.0	0.0
2.75	+0.404	+ 1.60	−0 2.4	−0.9	0.0	0.0
3.75	0.587	2.42	5 7	1.1	0.0	0.0
4.75	0.788	3.36	9 9	1.1	0.0	0.0
5.75	1.002	4.42	14.1	0 9	0.0	0.0
6.75	+1.220	+ 5.58	−0 17.7	−0.6	0.0	0.0
7.75	+1.437	+ 6.85	−0 19.9	−0.1	0.0	0.0
8.75	1.642	8.19	20.4	+0.4	0.0	0.0
9.75	1.829	9.63	19.2	+0.9	0.0	0.0
10.75	1.992	11.15	16.8	+1.2	0.0	0.0
11.75	+2.128	+ 12.76	−0 13.8	+1.4	0.0	0.0
12.75	+2.237	+ 14.46	−0 10.9	+1.4	0.0	0.0
13.75	2.319	16.25	8.6	1.3	0.0	0.0
14.75	2.379	18.12	7.1	1.1	0.0	+0.1
8 15.75	2.418	20.05	6.7	0.9	0.0	0.1
16.75	+2.440	+ 22.03	−0 7.3	+0.6	0.0	+0.1
17.75	+2.449	+ 24.05	−0 8.6	+0.5	0.0	+0.1
18.75	2.445	26.06	10.4	0.4	0.0	0.1
19.75	2.429	28.07	12.5	0.3	0.0	0.1
20 75	2.401	30.05	14.5	0.4	0.0	0.1
21.75	+2.356	+ 31.98	−0 16.2	+0.6	0.0	+0.1
22 75	+2.292	+ 33.84	−0 17.0	+0.9	0.0	+0.1
23.75	2 203	35 61	16.8	1.1	0.0	0.1
24 75	2.089	37.29	15.2	1.4	0.0	0.1
25 75	1.950	38.85	12.4	1.6	0.0	0.1
26 75	+1.790	+ 40.31	−0 8.9	+1.6	0 0	+0.1
27 75	+1.614	+ 41.67	−0 5.2	+1.5	0.0	+0.1
28.75	1.428	42.92	−0 2.0	+1.2	0.0	0.0
29 75	1.237	44.07	+0 0.2	+0.8	0.0	0.0
30 75	1.044	45.12	+0 1.0	+0 3	0.0	0.0
31 75	+0.850	+ 46 07	+0 0.2	−0.2	0.0	0.0
Feb 1 75	+0 657	+ 46.91	−0 1.9	−0.6	0.0	0.0
2.75	0 467	47.70	5 1	0.9	0.0	0.0
3.75	0 282	48.32	8.9	1.0	0.0	0.0
4 75	+0 107	48.87	12.7	1.0	0.0	0.0
5.75	−0.050	+ 49.36	−0 15.6	−0.8	0.0	0.0

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Perturbations of the Elements of Hyperion by Titan—Continued.

Greenwich Mean Time.	$\Delta\mu$	ΔE	ΔP	$\Delta\varphi$	Δi	Δn
1885	′	′	° ′	′	′	′
Feb. 6.75	−0.180	+ 49.78	−0 17.1	−0.4	0.0	0.0
7.75	0.269	50.17	16.7	−0.1	0.0	0.0
8.75	0.304	50.57	14.4	+0.2	0.0	0.0
9.75	0.277	51.01	10.8	+0.2	0.0	0.0
10.75	−0.186	+ 51.57	−0 7.1	+0.1	0.0	0.0
11.75	−0.033	+ 52.27	−0 4.2	−0.4	0.0	0.0
12.75	+0.180	53.22	3.2	1.0	0.0	0.0
13.75	0.458	54.48	4.9	1.7	0.0	0.0
14.75	0.811	56.18	9.8	2.4	0.0	+0.1
15.75	+1.264	+ 58.48	−0 18.5	−3.0	0.0	+0.1
16.75	+1.855	+ 61.63	−0 31.7	−3.3	0.0	+0.1
17.75	2.638	66.14	0 50.2	3.1	0.0	0.1
18.75	3.613	72.91	1 14.8	2.4	0.0	+0.1
19.75	4.446	82.83	1 44.2	1.7	+0.1	0.0
δ 20.75	+4.426	+ 94.17	−2 12.5	−2.2	+0.2	0.0
21.75	+3.775	+103.17	−2 34.6	−3.5	+0.3	−0.1
22.75	3.169	109.48	2 50.7	4.3	0.3	0.1
23.75	2.769	114.26	3 1.8	4.5	0.3	0.1
24.75	2.535	118.20	3 8.6	4.3	0.3	−0.1
25.75	+2.421	+121.69	−3 11.8	−3.9	+0.3	0.0
26.75	+2.389	+124.92	−3 12.2	−3.5	+0.3	0.0
27.75	2.415	128.00	10.6	3.2	0.3	0.0
28.75	2.478	131.03	7.8	3.0	0.3	0.0
March 1.75	2.564	134.05	4.8	3.0	0.3	0.0
2.75	+2.663	+137.14	−3 2.0	−3.1	+0.3	0.0
3.75	+2.770	+140.29	−2 59.9	−3.3	+0.3	0.0
4.75	2.887	143.55	58.5	3.6	0.3	0.0
5.75	3.017	146.91	58.4	3.9	0.3	0.0
6.75	3.164	150.40	2 59.5	4.3	0.3	0.0
7.75	+3.330	+154.02	−3 2.0	−4.5	+0.3	0.0
8.75	+3.517	+157.75	−3 5.7	−4.7	+0.3	0.0
9.75	3.721	161.61	9.9	4.6	0.3	0.0
10.75	3.936	165.57	14.0	4.4	0.3	0.0
11.75	4.154	169.64	17.1	4.0	0.3	0.0
12.75	+4.369	+173.81	−3 18.8	−3.5	+0.3	0.0
13.75	+4.571	+178.06	−3 18.7	−3.0	+0.3	0.0
14.75	4.755	182.41	17.0	2.5	0.3	0.0
15.75	4.913	186.83	14.2	2.2	0.3	0.0
16.75	+5.045	+191.35	−3 11.1	−2.1	+0.3	0.0
17.75	+5.150	+195.97	−3 8.2	−2.1	+0.3	0.0
18.75	5.229	200.69	6.1	2.3	0.3	0.0
19.75	5.287	205.48	4.9	2.5	0.3	0.0
δ 20.75	+5.327	+210.32	−3 4.8	−2.7	+0.3	0.0

With *Elements II of Hyperion* and the perturbations tabulated above, an ephemeris was computed and a comparison made with the observations of Prof. ASAPH HALL, U. S. Navy, published in Washington Observations, 1884 and 1885. In computing the ephemeris places the following formulæ* were employed:

$$\xi = r\frac{\rho_0}{\rho}\Delta \sin f \sin (F+u),$$

$$\eta = r\frac{\rho_0}{\rho}\Delta \sin g \sin (G+u),$$

$$\zeta = r\frac{\rho_0}{\rho}\Delta \sin h \sin (H+u),$$

$$x = s \sin p = \frac{\xi}{1+\zeta},$$

$$y = s \cos p = \frac{\eta}{1+\zeta},$$

* See Astronomische Nachrichten, Nr. 193.

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f, g, h, F, G, and H being given by the following:

$$\sin f \sin F = -\sin(\alpha - N),$$
$$\sin f \cos F = \cos(\alpha - N)\cos J,$$
$$\cos f = -\cos(\alpha - N)\sin J,$$

$$l \sin L = \cos J \sin(\alpha - N),$$
$$l \cos L = \sin J,$$

$$\sin g \sin G = -\sin\delta \cos(\alpha - N),$$
$$\sin g \cos G = l \cos(\delta + L),$$
$$\cos g = q \cos(\delta - Q),$$

$$q \sin Q = \sin J \sin(\alpha - N),$$
$$q \cos Q = \cos J,$$

$$\sin h \sin H = \cos\delta \cos(\alpha - N),$$
$$\sin h \cos H = l \sin(\delta + L),$$
$$\cos h = q \sin(\delta - Q).$$

The notation used in the above formulae and in other parts of this paper follows:

E = Mean longitude of satellite.
P = Longitude of peri-saturnium of satellite's orbit.
N = Longitude of node on the equator.
n = Longitude of node on the ecliptic.
J = Inclination of orbit to equator.
i = Inclination of orbit to ecliptic.
e = Eccentricity of orbit = sin φ.
μ = Mean motion in longitude.
Δ = Mean distance of satellite from planet, as seen at distance ρ_0 of planet.
ρ_0 = Assumed mean distance of planet from Sun.
ρ = Geocentric distance of planet.
α = Right ascension of planet.
δ = Declination of planet.
ϵ = Eccentric anomaly of satellite.
u = Longitude of satellite in orbit, starting from node on the equator.
s = Observed distance of satellite.
p = Observed position angle of satellite.
w = Distance along orbit from node on equator to node on ecliptic.

The values of f, g, h, F, G, and H were computed for every 5 days during the period of observation; the values for each observation being found by interpolation.

Observations of Hyperion.

Washington Mean Time.			p	s	Δs	x_0	x_c	y_0	y_c	$x_0 - x_c$	$y_0 - y_c$
1884	h	m	°	″	″	″	″	″	″	″	″
Sept. 20	15	30.1	134.40	129.60	+0.17	+ 92.47	+ 87.35	− 90.56	− 91.36	+ 5.12	+ 0.80
22	16	34.6	105.30	206.89	−0.17	+199.39	+195.80	− 54.55	− 55.42	+ 3.59	+ 0.87
23	15	12.7	97.33	235.02	−0.12	+232.97	+229.43	− 29.97	− 32.77	+ 3.54	+ 2.80
23	16	25.2	96.98	235.20	−0.11	+233.35	+230.88	− 28.57	− 31.50	+ 2.47	+ 2.93
24	15	27.2	91.06	252.55	−0.05	+252.45	+251.24	− 4.67	− 6.40	+ 1.21	+ 1.73
24	16	22.7	90.75	251.81	−0.06	+251.73	+251.77	− 3.30	− 5.37	− 0.04	+ 2.07
25	15	29.3	85.15	258.07	0.00	+257.15	+257.16	+ 21.82	+ 20.27	− 0.01	+ 1.55
25	15	49.3	85.12	258.00	0.00	+257.07	+257.12	+ 21.95	+ 20.63	− 0.05	+ 1.32
27	15	54.3	72.58	228.43	+0.26	+218.20	+220.10	+ 68.46	+ 68.70	− 1.90	− 0.24
28	15	0.2	63.98	197.31	+0.21	+177.50	+180.38	+ 86.65	+ 86.09	− 2.88	+ 0.56

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Observations of Hyperion—Continued.

Washington Mean Time.			p	s	Δs	x_o	x_c	y_o	y_c	x_o-x_c	y_o-y_c
1884	h	m	°	″	″	″	″	″	″	″	″
Oct. 1	15	34.5	351.75	98.38	+0.02	− 14.12	− 9.51	+ 97.38	+ 97.70	− 4.61	− 0.32
4	16	41.7	278.05	191.22	−0.15	−189.19	−186.30	+ 26.76	+ 29.38	− 2.89	− 2.62
5	16	24.3	268.32	209.73	−0.07	−209.57	−208.18	− 6.15	− 3.91	− 1.39	− 2.24
6	16	37.4	259.05	208.67	+0.05	−204.92	−205.00	− 39.65	− 37.52	+ 0.08	− 2.13
11	16	14.2	144.80	121.79	−0.12	+ 70.13	+ 66.32	− 99.42	− 98.96	+ 3.81	− 0.46
23	12	56.8	329.38	108.11	−0.11	− 55.01	− 51.86	+ 92.94	+ 93.57	− 3.15	− 0.63
25	13	13.9	283.38	183.31	−0.18	−178.16	−175.26	+ 42.38	+ 44.65	− 2.90	− 2.27
Nov. 8	11	49.5	78.66	261.25	+0.08	+256.23	+259.69	+ 51.39	+ 53.23	− 3.46	− 1.84
9	11	42.5	71.32	240.29	+0.13	+227.76	+228.04	+ 77.00	+ 76.68	− 0.28	+ 0.32
10	11	55.6	61.88	202.11	+0.18	+178.42	+179.70	+ 95.34	+ 95.06	− 1.28	+ 0.28
11	11	22.6	48.09	168.78	+0.27	+125.81	+119.68	+112.92	+105.98	[+ 6.13]	[+ 6.94]
12	12	22.4	21.25	116.60	+0.21	+ 42.34	+ 45.40	+108.87	+108.46	− 3.06	+ 0.41
13	11	33.7	343.62	103.52	−0.04	− 29.18	− 27.66	+ 99.28	+101.25	− 1.52	− 1.97
14	11	22.7	309.48	131.82	−0.14	−101.64	− 99.97	+ 83.72	+ 84.01	− 1.67	− 0.29
15	10	51.3	289.43	172.42	−0.20	−162.41	−160.72	+ 57.29	+ 58.15	− 1.69	− 0.86
16	11	51.3	275.95	207.82	−0.12	−206.58	−205.39	+ 21.53	+ 23.49	− 1.19	− 1.96
17	11	14.2	266.31	223.31	−0.04	−222.81	−222.52	− 14.37	− 11.88	− 0.29	− 2.49
20	11	17.5	231.15	156.81	+0.19	−122.27	−123.30	− 98.48	− 97.26	+ 1.03	− 1.22
21	10	51.0	207.08	122.63	+0.10	− 55.87	− 57.14	−109.28	−108.36	+ 1.27	− 0.92
21	11	59.0	205.15	121.03	+0.09	− 51.47	− 53.77	−109.64	−108.66	+ 2.30	− 0.98
22	10	32.1	170.65	112.68	−0.03	+ 18.30	+ 14.66	−111.15	−109.91	+ 3.64	− 1.24
24	10	58.6	119.32	178.16	−0.22	+155.15	+152.89	− 87.14	− 86.64	+ 2.26	− 0.50
26	10	46.7	98.91	253.33	−0.14	+250.13	+247.98	− 39.21	− 39.11	+ 2.15	− 0.10
29	11	34.0	79.78	274.45	+0.09	+270.18	+269.86	+ 48.71	+ 47.94	+ 0.32	+ 0.77
Dec. 4	10	51.1	355.60	105.00	+0.02	− 8.06	− 7.32	+104.71	+106.41	− 0.74	− 1.70
7	10	18.8	279.98	201.04	−0.18	−197.82	−197.14	+ 34.81	+ 35.80	− 0.68	− 0.99
8	9	57.8	269.79	223.33	−0.05	−223.28	−222.71	− 0.82	+ 0.08	− 0.57	− 0.90
9	9	52.9	260.39	225.15	+0.04	−222.03	−221.45	− 37.59	− 36.03	− 0.58	− 1.56
15	9	51.5	123.98	165.45	−0.21	+137.02	+135.95	− 92.35	− 92.37	+ 1.07	+ 0.02
19	9	37.2	87.98	280.64	−0.02	+280.45	+280.28	+ 9.89	+ 10.66	+ 0.17	− 0.77
26	8	14.0	327.06	105.08	−0.11	− 62.53	− 61.55	+ 96.49	+ 96.50	− 0.98	− 0.01
1885											
Jan. 2	8	45.7	221.65	139.34	+0.15	− 92.70	− 92.34	−104.23	−103.50	− 0.36	− 0.73
8	8	40.9	95.62	261.80	−0.11	+260.43	+259.47	− 25.63	− 25.34	+ 0.96	− 0.29
9	9	2.5	89.27	274.91	−0.02	+274.87	+275.14	+ 3.50	+ 4.09	− 0.27	− 0.59
10	8	39.0	83.28	275.38	+0.04	+273.52	+273.05	+ 32.23	+ 32.32	+ 0.47	− 0.09
12	7	20.0	70.01	234.38	+0.18	+220.42	+219.13	+ 80.18	+ 80.34	+ 1.29	− 0.16
13	8	6.1	59.55	192.88	+0.18	+166.43	+166.13	+ 97.84	+ 97.85	+ 0.30	− 0.01
17	10	50.2	301.92	145.24	−0.17	−123.13	−122.13	+ 76.70	+ 76.13	− 1.00	+ 0.57
21	8	39.9	255.15	209.22	+0.11	−202.34	−201.47	− 53.65	− 52.84	− 0.87	− 0.81
22	7	59.4	244.00	180.68	+0.12	−162.50	−162.39	− 79.26	− 79.25	− 0.11	− 0.01
29	7	1.6	97.40	247.11	−0.12	+244.93	+245.76	− 31.81	− 32.03	− 0.83	+ 0.22
Feb. 1	6	55.7	78.88	258.23	+0.08	+253.46	+253.18	+ 49.82	+ 50.43	+ 0.28	− 0.61
6	7	4.9	320.32	171.92	−0.04	−109.75	− 24.04	+132.28	+ 99.14	[−85.71]	[+33.14]
10	7	7.0	267.70	213.24	−0.03	−213.04	−211.26	− 8.56	− 7.69	− 1.78	− 0.87
11	6	46.6	258.70	208.01	+0.07	−204.05	−203.26	− 40.77	− 40.66	− 0.79	− 0.11
20	8	51.6	92.47	251.14	−0.06	+250.85	+252.45	− 10.82	− 9.46	− 1.60	− 1.36
21	7	7.6	86.85	259.36	0.00	+258.96	+257.93	+ 14.25	+ 15.86	+ 1.03	− 1.61
Mar. 3	8	44.9	268.77	203.67	−0.04	−203.58	−202.31	− 4.37	− 3.09	− 1.27	− 1.28
5	6	54.9	250.60	.....	.....	.....	.....	.....	.....	....	....
8	7	1.5	182.90	101.70	+0.01	− 5.15	− 4.25	−101.58	−100.59	− 0.90	− 0.99
9	7	1.0	148.35	113.32	−0.20	+ 59.36	+ 60.59	− 96.30	− 96.01	− 1.23	− 0.29
10	7	4.1	125.35	146.54	−0.20	+119.36	+120.74	− 84.67	− 83.97	− 1.38	− 0.70
17	7	18.3	68.12	200.72	+0.15	+186.40	+185.18	+ 74.86	+ 76.52	+ 1.22	− 1.66
18	8	27.8	56.30	171.83	+0.15	+134.80	+133.30	+ 89.90	+ 90.85	+ 1.50	− 0.95
20	7	21.9	7.02	95.43	+0.06	+ 11.67	+ 10.34	+ 94.78	+ 95.40	+ 1.33	− 0.62

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The time given is the time of the observation in position angle and Δs is the correction to reduce the observed distance to that time.

In the equations of condition for correcting the assumed elements, the mean motion and the mean distance have been considered as independent, making seven unknowns, and the fractional part of itself by which the mass must be increased makes an eighth.

The form of the equation * arising from the residuals in x is

$$a_1 \cdot dE_0 + a_2 \cdot d\mu + b_1 \cdot edP + c_1 \cdot de + d_1 \cdot dJ + e_1 \cdot \sin J \; dN + f_1 \cdot dJ + g_1 \cdot m = n,$$

where

$$a_1 = \frac{f'}{\cos \varphi}\left\{\cos (F+u) + e \cos (F'+P)\right\},$$

$$a_2 = a_1 \; [t - \text{Jan. o. o, 1885}],$$

$$b_1 = -\frac{f'}{\cos \varphi}\left\{\cos (F+u)\left(\cos \varepsilon \cos \varphi + \frac{c}{1+\cos \varphi}\right) + \cos (F'+P)\right\},$$

$$c_1 = \frac{f'}{\cos \varphi}\left\{\cos (F+u) \sin \varepsilon - \sin (F'+P) \cos \varphi\right\},$$

$$d_1 = \frac{\xi}{J},$$

$$e_1 = -f' \tan \tfrac{1}{2} i \frac{r}{J} \cos (F+u) \cos w - \frac{\rho_0 r}{\rho J} \cos f \cos u,$$

$$f_1 = f' \tan \tfrac{1}{2} i \frac{r}{J} \cos (F+u) \sin w + \frac{\rho_0 r}{\rho J} \cos f \sin u,$$

g_1 = perturbation in x produced by Titan,

in which

$$f' = \frac{\rho_0}{\rho} \sin f,$$

and

$$F' = F - n + w.$$

The corresponding equation in y is obtained by replacing f, F, and ξ by g, G, and η respectively, and where g_1 = perturbation in y produced by Titan.

In order to facilitate the solution of the normal equations the following transformations were made in the equations of condition:

$$dE = dE' + \sin J \; dN - dJ = \tfrac{1}{2} (x' + w' - t')$$

$$\begin{array}{ll} dE' = \tfrac{1}{2} x' & dJ = \tfrac{1}{2} v' \\ d\mu = \tfrac{1}{10} y' & \sin J \; dN = \tfrac{1}{2} w' \\ edP = \tfrac{1}{3} z' & dJ = \tfrac{1}{2} t' \\ de = \tfrac{1}{4} u' & m = \tfrac{1}{10} m'. \end{array}$$

The transformed equation will then be

$$a_1' x' + a_2' y' + b_1' z' + c_1' u' + d_1' v' + e_1' w' + f_1' t' + g_1' m' = n,$$

where the coefficients are given in the following table.

* See Astronomische Nachrichten, Nr. 193.

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The first column gives the Greenwich Mean Time corrected for the aberration time of the observation in position angle. The last column gives the final residuals resulting from the solution that immediately follows.

Coefficients of Equations of Condition in x.

Greenwich Mean Time.	a_1'	a_2'	b_1'	c_1'	d_1'	e_1'	f_1'	g_1'	n	v
1884									"	"
Sept. 20.8086	+0.490	−0.993	+0.182	+0.490	+0.204	+0.443	−0.385	+1.032	+5.12	+0.07
22.8536	+0.330	−0.654	+0.236	+0.356	+0.457	+0.312	−0.273	+0.776	+3.59	+0.09
23.7968	+0.227	−0.446	+0.200	+0.302	+0.535	+0.226	−0.200	+0.579	+3.54	+0.95
23.8472	+0.221	−0.434	+0.197	+0.300	+0.539	+0.221	−0.196	+0.568	+2.47	−0.07
24.8070	+0.106	−0.206	+0.132	+0.268	+0.586	+0.122	−0.111	+0.340	+1.21	−0.34
24.8456	+0.101	−0.196	+0.129	+0.268	+0.587	+0.117	−0.108	+0.331	−0.04	−1.55
25.8086	−0.021	+0.041	+0.053	+0.267	+0.600	+0.011	−0.017	+0.096	−0.01	−0.49
25.8224	−0.023	+0.044	+0.052	+0.267	+0.600	+0.009	−0.015	+0.093	−0.05	−0.52
27.8261	−0.275	+0.518	−0.057	+0.357	+0.513	−0.217	+0.181	−0.326	−1.90	−0.23
28.7886	−0.383	+0.714	−0.055	+0.425	+0.420	−0.318	+0.270	−0.458	−2.88	−0.25
Oct. 1.8127	−0.559	+1.008	+0.199	+0.528	−0.022	−0.502	+0.442	−0.475	−4.61	−0.01
4.8597	−0.266	+0.464	+0.236	+0.305	−0.434	−0.264	+0.241	−0.137	−2.89	−0.25
5.8477	−0.075	+0.130	+0.108	+0.269	−0.485	−0.094	+0.091	−0.036	−1.39	−0.33
6.8569	+0.128	−0.219	−0.028	+0.297	−0.478	+0.090	−0.072	+0.063	+0.08	−0.59
11.8412	+0.527	−0.845	+0.164	+0.527	+0.155	+0.474	−0.411	+0.506	+3.81	−0.03
23.7051	−0.568	+0.776	+0.291	+0.514	−0.121	−0.517	+0.459	−0.250	−3.15	+0.59
25.7171	−0.355	+0.471	+0.302	+0.342	−0.408	−0.342	+0.310	−0.115	−2.90	−0.15
Nov. 8.6594	[−0.187]	[+0.196]	[−0.014]	[+0.330]	[+0.605]	[−0.135]	[+0.110]	[+0.001]	[−3.46]	[−3.38]
9.6546	−0.318	+0.327	−0.048	+0.397	+0.532	−0.254	+0.215	−0.035	−0.28	+0.32
10.6637	−0.437	+0.440	−0.033	+0.474	+0.419	−0.366	+0.314	−0.049	−1.28	−0.14
12.6824	−0.588	+0.568	+0.143	+0.571	+0.106	−0.519	+0.455	−0.008	−3.06	−0.89
13.6487	−0.594	+0.563	+0.252	+0.552	−0.064	−0.535	+0.474	+0.028	−1.52	+0.95
14.6411	−0.541	+0.502	+0.327	+0.484	−0.233	−0.498	+0.445	+0.058	−1.67	+0.85
15.6193	−0.425	+0.386	+0.326	+0.390	−0.375	−0.402	+0.363	+0.070	−1.69	+0.52
16.6610	−0.240	+0.212	+0.230	+0.307	−0.479	−0.242	+0.221	+0.062	−1.19	+0.30
17.6353	−0.032	+0.028	+0.088	+0.285	−0.519	−0.057	+0.057	+0.045	−0.29	+0.27
20.6377	+0.492	−0.397	−0.095	+0.514	−0.288	+0.423	−0.369	+0.080	+1.03	−0.76
21.6194	+0.562	−0.442	−0.011	+0.571	−0.133	+0.491	−0.428	+0.120	+1.27	−0.74
21.6666	+0.564	−0.443	−0.006	+0.573	−0.126	+0.493	−0.430	+0.122	+2.30	+0.29
22.6063	+0.577	−0.443	+0.099	+0.581	+0.034	+0.511	−0.446	+0.156	+3.64	+1.66
24.6247	+0.475	−0.346	+0.258	+0.476	+0.357	+0.434	−0.378	+0.185	+2.26	+0.69
26.6165	+0.260	−0.179	+0.227	+0.335	+0.579	+0.256	−0.224	+0.146	+2.15	+1.09
29.6494	−0.157	+0.098	−0.014	+0.323	+0.629	−0.106	+0.087	+0.066	+0.32	−0.07
Dec. 4.6198	−0.605	+0.319	+0.206	+0.574	−0.017	−0.540	+0.477	+0.226	−0.74	+0.46
7.5974	−0.304	+0.142	+0.259	+0.338	−0.460	−0.298	+0.270	+0.165	−0.68	+0.46
8.5828	−0.100	+0.045	+0.125	+0.291	−0.519	−0.118	+0.110	+0.055	−0.57	+0.12
9.5794	+0.118	−0.051	−0.024	+0.313	−0.516	+0.078	−0.065	−0.066	−0.58	−0.43
15.5784	+0.503	−0.155	+0.233	+0.504	+0.317	+0.455	−0.397	−0.136	+1.07	+0.58
19.5684	+0.025	−0.006	+0.093	+0.288	+0.654	+0.054	−0.049	−0.013	+0.17	−0.32
26.5105	−0.584	+0.052	+0.287	+0.534	−0.143	−0.527	+0.470	+0.007	−0.98	−0.19
1885										
Jan. 2.5323	+0.533	+0.027	−0.072	+0.546	−0.216	+0.460	−0.406	+0.001	−0.36	−0.54
8.5287	+0.191	+0.033	+0.188	+0.308	+0.605	+0.196	−0.170	−0.014	+0.96	+0.80
9.5436	+0.054	+0.010	+0.104	+0.285	+0.642	+0.078	−0.068	−0.025	−0.27	−0.66
10.5273	−0.084	−0.018	+0.020	+0.298	+0.637	−0.042	+0.036	−0.038	+0.47	−0.15
12.4723	−0.343	−0.086	−0.072	+0.411	+0.511	−0.274	+0.239	−0.075	+1.29	+0.41
13.5043	−0.458	−0.124	−0.048	+0.489	+0.387	−0.382	+0.335	−0.099	+0.30	−0.54
17.6180	−0.499	−0.176	+0.310	+0.455	−0.285	−0.459	+0.412	−0.128	−1.00	−0.68
21.5272	+0.230	+0.099	−0.089	+0.343	−0.470	+0.180	−0.160	+0.130	−0.87	−0.64
22.4990	+0.392	+0.176	−0.136	+0.432	−0.379	+0.327	−0.292	+0.201	−0.11	+0.07
29.4584	+0.220	+0.130	+0.189	+0.315	+0.573	+0.218	−0.190	+0.106	−0.83	−0.77
Feb. 1.4541	−0.178	−0.116	−0.040	+0.319	+0.590	−0.125	+0.110	−0.119	+0.28	−0.64
10.4612	−0.040	−0.034	+0.073	+0.274	−0.493	−0.062	+0.056	−0.029	−1.78	−1.40
11.4469	+0.160	+0.135	−0.058	+0.307	−0.474	+0.117	−0.104	+0.101	−0.79	−0.29
20.5329	+0.110	+0.113	+0.138	+0.272	+0.589	+0.124	−0.107	+0.001	−1.60	−1.54
21.4606	−0.011	−0.011	+0.065	+0.268	+0.602	+0.020	−0.016	−0.122	+1.03	+0.66
Mar. 3.5272	−0.068	−0.084	+0.107	+0.260	−0.472	−0.086	+0.078	−0.143	−1.27	−0.86
8.4549	+0.521	+0.703	+0.073	+0.525	−0.010	+0.455	−0.401	+0.931	−0.90	+0.29
9.4545	+0.502	+0.687	+0.170	+0.499	+0.141	+0.444	−0.390	+0.865	−1.23	+0.06
10.4565	+0.447	+0.621	+0.235	+0.442	+0.282	+0.402	−0.351	+0.742	−1.38	−0.12
17.4657	−0.338	−0.517	−0.040	+0.389	+0.432	−0.274	+0.241	−0.887	+1.22	−0.04
18.5139	−0.438	−0.678	0.000	+0.457	+0.311	−0.368	+0.325	−1.161	+1.50	+0.19
20.4680	−0.532	−0.846	+0.181	+0.504	+0.024	−0.470	+0.419	−1.493	+1.33	+0.45

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Coefficients of Equations of Condition in y.

Greenwich Mean Time.		a_1'	a_2'	b_1'	c_1'	d_1'	e_1'	f_1'	g_1'	n	
										"	"
1884											
Sept.	20 8086	+0.093	−0.189	+0.187	+0.053	−0.213	−0.403	−0.243	+0.277	+0 80	+0
	22 8536	+0.179	−0 356	+0.266	+0.055	−0.129	−0.381	−0.050	+0.467	+0 87	−0
	23.7968	+0.201	−0.395	+0.294	+0.035	−0.076	−0.336	+0.051	+0.514	+2 80	+1
	23.8472	+0 202	−0.396	+0.295	+0 034	−0.074	−0.333	+0.056	+0.516	+2 93	+1
	24.8070	+0.211	−0 411	+0.308	+0.006	−0.015	−0.267	+0.156	+0.533	+1.73	−0
	24 8456	+0.212	−0.411	+0 308	+0.005	−0 013	−0 264	+0.160	+0 533	+2 07	+0
	25.8086	+0.208	−0.401	+0.303	−0.025	+0 047	−0.182	+0.251	+0.517	+1 55	−0
	25 8224	+0 208	−0.400	+0.303	−0 026	+0.048	−0.181	+0.253	+0.517	+1 32	−0
	27.8261	+0.162	−0 304	+0 244	−0 065	+0 160	+0 018	+0.391	+0 399	−0 24	−1
	28.7886	+0.120	−0.224	+0.206	−0 064	+0 201	+0 113	+0.425	+0.315	+0 56	−0
Oct.	1 8127	−0 076	+0.136	+0.173	+0 021	+0 228	+0.304	+0 364	+0 055	−0 32	+0
	4.8597	−0.258	+0.450	+0.318	+0 030	+0 068	+0.188	+0.061	−0.037	−2 62	−0
	5.8477	−0 271	+0.466	+0 332	−0.007	−0 009	+0 091	−0.063	−0 038	−2 24	+0
	6 8569	−0 251	+0.427	+0.308	−0.043	−0 088	−0 019	−0.182	−0 022	−2 13	+0
	11.8412	+0.075	−0.121	+0 183	+0 047	−0 231	−0.376	−0.317	+0.151	−0 46	−0
	23.7051	−0 123	+0 168	+0 203	+0.034	+0.218	+0 316	+0 335	+0.006	−0 63	+0
	25.7171	−0 251	+0.333	+0.313	+0.035	+0.104	+0 231	+0.122	−0 034	−2 27	−0
Nov.	8.6594	[+0.201]	[−0 210]	[+0 291]	[−0.067]	[+0.124]	[−0 080]	[+0.361]	[+0 142]	[−1 84]	[−2
	9.6546	+0.166	−0.171	+0 251	−0 077	+0.179	+0.028	+0.422	+0.118	+0 32	−0
	10.6637	+0.116	−0.117	+0.209	−0.070	+0.222	+0.133	+0 457	+0.092	+0 28	−0
	12.6824	−0 022	+0 021	+0 171	−0 008	+0 253	+0 288	+0 435	+0.055	+0 41	+0
	13.6487	−0 098	+0 093	+0.193	+0 027	+0.236	+0 319	+0 380	+0.052	−1 97	−1
	14 6411	−0 176	+0 163	+0.242	+0 050	+0.196	+0.312	+0.293	+0.056	−0 29	+0
	15.6193	−0 219	+0 217	+0 300	+0 048	+0 136	+0.266	+0.183	+0.065	−0 86	+0
	16 6610	−0.280	+0.249	+0 346	+0 019	+0.055	+0.182	+0.047	+0.072	−1 96	−0
	17.6353	−0 286	+0 248	+0 351	−0 022	−0 028	+0 081	−0.086	+0.070	−2 49	−0
	20.6377	−0.128	+0 103	+0 206	−0 048	−0 227	−0.250	−0 370	+0.044	−1 22	−0
	21.6194	−0 050	+0 039	+0.176	−0 014	−0 253	−0.333	−0 386	+0.047	−0 92	−0
	21.6666	−0 046	+0 036	+0 176	−0 012	−0 254	−0 337	−0 385	+0.048	−0 98	−0
	22.6063	+0.025	−0 020	+0.176	+0.023	−0 257	−0.396	−0.359	+0.059	−1 24	−0
	24.6247	+0 149	−0 109	+0.243	+0 065	−0 202	−0 444	−0.203	+0.094	−0 50	−0
	26.6165	+0 218	−0 150	+0 319	+0 039	−0 091	−0 382	+0.023	+0.117	−0 10	−0
	29.6494	+0 211	−0 132	+0 308	−0.056	+0.112	−0 121	+0.343	+0.099	+0 77	+0
Dec.	4.6198	−0 077	+0.040	+0.186	+0.021	+0.248	+0.311	+0 416	+0.096	−1 70	−1
	7.5974	−0 274	+0 128	+0 338	+0.037	+0.083	+0.220	+0.105	+0.202	−0 99	+0
	8 5828	−0 292	+0 131	+0.358	−0.002	0 000	+0 126	−0 032	+0.214	−0 90	+0
	9.5794	−0 274	+0 117	+0 337	−0.041	−0 084	+0.015	−0.167	+0.202	−1 56	−0
	15.5784	+0.135	−0.042	+0.230	+0.067	−0 216	−0.441	−0.249	+0.005	+0 02	+0
	19.5684	+0 232	−0 053	+0.336	−0.021	+0 025	−0 262	+0.205	−0.010	−0 77	−0
	26 5105	−0 133	+0 012	+0 213	+0 040	+0 225	+0.311	+0.374	0.000	−0 01	+0
1885											
Jan.	2 5323	−0 093	−0 005	+0.189	−0 033	−0.242	−0 264	−0.392	+0.001	−0 73	−0
	8 5287	+0 224	+0.038	+0.327	+0.023	−0.059	−0.358	+0.048	+0 011	−0 29	+0
	9 5430	+0 210	+0 044	+0 334	−0 011	+0.010	−0 285	+0.166	+0.012	−0 59	−0
	10 5273	+0 220	+0 046	+0.319	−0 042	+0 075	−0 197	+0.270	+0 013	−0 09	+0
	12.4723	+0.160	+0.040	+0 248	−0 073	+0.187	+0.004	+0.421	+0.008	−0 16	+0
	13 5043	+0 106	+0 029	+0 204	−0 063	+0.228	+0 110	+0.462	0 000	−0 01	+0
	17 6180	−0 196	−0 069	+0 257	+0 057	+0 177	+0 290	+0 293	−0 074	+0 57	+0
	21 5272	−0 241	−0 105	+0 301	−0 055	−0 123	−0 027	−0 217	−0.098	−0 81	−0
	22 4990	−0 184	−0.083	+0 245	−0 059	−0 185	−0 130	−0 315	−0.075	−0 01	+0
	29.4584	+0.215	+0 120	+0 312	+0 036	−0 075	−0 366	+0 007	+0.121	+0 22	+0
Feb.	1 4541	+0 199	+0 129	+0 291	−0 054	+0 118	−0 128	+0 322	+0.114	−0 61	+0
	10 4612	−0 274	−0 227	+0 337	−0 009	−0 018	+0.111	−0 038	−0.182	−0 87	−0
	11 4409	−0 260	−0 213	+0 309	−0.043	−0 095	+0.013	−0.108	−0.166	−0 11	+0
	20 5329	+0 216	+0 222	+0 314	+0 003	−0.022	−0 305	+0.092	+0.107	−1 36	−0
	21 4066	+0 214	+0 224	+0 309	−0 029	+0 037	−0 236	+0.190	+0.171	−1.61	−0
Mar.	3.5272	−0.205	−0.331	+0.325	−0.015	−0.007	+0.117	−0.020	−0.582	−1.28	−0
	8 4549	+0 092	+0 003	+0 158	+0.008	−0 235	−0.314	−0.359	−0.036	−0 99	−0
	9 4545	+0 066	+0 091	+0.175	+0.036	−0.224	−0.302	−0.318	+0.081	−0 29	+0
	10 4505	+0.120	+0 167	+0 209	+0 051	−0 196	−0 385	−0.248	+0.176	−0.70	+0
	17 4057	+0 135	+0.206	+0 210	−0 073	+0.178	+0.027	+0.384	+0.223	−1 66	−0
	18 5109	+0 052	+0 1.6	+0.173	−0 058	+0 212	+0.121	+0.415	+0.109	−0 95	−0
	20 4080	−0 047	−0.075	+0.159	+0 003	+0.222	+0.244	+0.390	−0.216	−0.62	−0

The preceding equations of condition give rise to the following normal equations:

$$
\begin{aligned}
+10.6599x' - 4.9428y' - 0.7420z' - 0.5865u' + 0.4991v' + 5.7803w' - 5.8657t' + 6.5644m' &= +31.729 \\
-4.9428 + 13.7942 - 0.4683 + 0.7065 - 1.2946 - 2.3888 + 2.8449 - 0.7958 &= -54.675 \\
-0.7420 + 0.4683 - 6.0657 + 2.6029 + 0.5369 - 1.7429 + 1.8137 + 2.5627 &= -8.790 \\
-0.5865 + 0.7065 + 2.6029 + 10.3640 + 2.0978 - 0.4960 + 0.2194 + 1.0209 &= -0.751 \\
+0.4991 - 1.2946 + 0.5369 + 2.0978 + 13.1182 + 3.0067 + 1.5943 + 0.6893 &= +16.096 \\
+5.7803 - 2.3888 - 1.7429 - 0.4960 + 3.0067 + 10.8764 - 3.7764 + 3.2694 &= +18.089 \\
-5.8657 + 2.8449 + 1.8137 + 0.2194 + 1.5943 - 3.7764 + 10.0671 - 3.2194 &= -18.058 \\
+6.5644 - 0.7958 + 2.5627 + 1.0209 + 0.6893 + 3.2694 - 3.2194 + 13.4947 &= +18.583
\end{aligned}
$$

$$[nn] = 310.52$$

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Solving these equations we obtain

	″	″		
x'	$+0.549$	± 0.250		
y'	-3.633	± 0.152		
z'	-2.010	± 0.242		
u'	$+0.389$	± 0.167		
v'	$+0.871$	± 0.149		
w'	-0.343	± 0.191		
t'	$+0.055$	± 0.199		
m'	$+1.300$	± 0.183		

	°	′	″
dE	$+0$	1.2	$\pm$ 2.6
dP	-1	36.4	$\pm$10.0
dN	-0	26.8	$\pm$12.9
dJ	$+0$	0.4	$\pm$ 1.4
de	$+0.00045$		$\pm$ 0.00017
$d\mu$	$-0°.00971$		$\pm 0°.00035$
$d\Delta$	$+0″.436$		$\pm$ 0″.065
m	$+0.1300$		$\pm$ 0.0156

$[nn.8] = 46.14$

$[vv] = 46.05$

The final elements of Hyperion and mass of Titan are as follows:

Epoch: Jan. 0.0, 1885, Greenwich Mean Time.

	°	′	″
E	$=359$	36.8	$\pm$ 2.6
P	$=335$	48.9	$\pm$10.0
N	$=124$	13.0	$\pm$12.9
J	$=$ 5	53.5	$\pm$ 1.4
e	$=$ 0.11188		$\pm$0.00017
μ	$=16°.88601$		$\pm 0°.00035$
Δ	$=214″.841$		$\pm$0″.065

$$m = \frac{1}{4172 \pm 58}$$

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ORBITS OF PHOBOS AND DEIMOS.

BY

J. C. HAMMOND.

FROM

OBSERVATIONS

MADE BY

H. L. RICE IN 1907.

B 19

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ORBITS OF PHOBOS AND DEIMOS.

The satellites of Mars were observed with the 26-inch equatorial in 1907 by Prof. H. L. RICE, U. S. Navy, formerly assistant astronomer at the United States Naval Observatory. Owing to the low altitude of the planet at this opposition, which was a favorable one with regard to its distance from the earth, the satellites were difficult objects and the nights on which they could be seen were few. Phobos was observed 14 times and Deimos 12 times on 8 nights each.

The measures were all made in rectangular coordinates from the limbs of the planet and each measure consisted usually of 4 settings of the micrometer in each coordinate. The settings were made in a symmetrical manner, as for example, two settings on the preceding limb, two on the north limb, two on the south limb, and finally, two on the following limb of the planet. In this way the times of the measures of both coordinates were nearly the same.

Since these satellites move rapidly and the apparent motion is not uniform, it was necessary to apply corrections to the means of the measured coordinates, to make them correspond to the means of the times. Corrections were also applied for differential refraction, for instrumental constants, and for the defective limb of the planet. These measures are published in this volume. (See pages A 4, A 5.)

The assumed elements, which have been used as the basis for this discussion, are those deduced by Prof. W. S. HARSHMAN, U. S. Navy. His elements of Deimos are published in the Astronomical Journal, Volume XIV, page 147. Those of Phobos are in manuscript.

Assumed Elements.

Epoch: 1907, July 0.0, Greenwich Mean Time.

	Phobos.	*Deimos.*
	°	°
u =	97.83	u = 247.27
N =	48.18 Equator.	N = 48.18 Equator.
J =	37.94	J = 37.94
n =	1128.84396	n = 285.16195
a =	12″.95 at distance unity.	a = 32″.51 at distance unity.

Both orbits are assumed to be circular and to lie in the same plane.

With these elements, the positions of the satellites for the times of the observations were computed by means of the auxiliary quantities of BESSEL and also by the well-known formulæ of MARTH, thus affording a rigorous check on the computed

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places. [illegible] formulae [illegible] are as follows:

Let

[illegible]

[illegible]

[illegible]

Phobos.

Date.	Washington Mean Time.	x		Washington Mean Time.	y		O–C	
		Obs.	Comp.		Obs.	Comp.	x	y
1907	h m s	"	"	h m s	"	"	"	"
June 21	12 46 21	−26.95	−26.60	12 46 52	+ 9.16	+ 9.47	−0.35	−0.31
21	13 15 28	−27.60	−27.99	13 15 26	+ 8.11	+ 8.38	+0.39	−0.27
30	11 8 26	−28.44	−28.50	11 8 2	+ 9.99	+10.34	+0.06	−0.35
30	11 36 40	−29.08	−29.00	11 36 8	+ 9.34	+ 9.27	−0.08	+0.07
30	14 35 57	+25.53	+25.18	14 42 59	− 9.72	−10.32	+0.35	+0.60
July 3	12 7 56	+29.61	+29.57	12 7 28	−10.28	−10.22	+0.04	−0.06
3	12 29 39	+28.45	+28.20	12 29 47	− 8.94	− 8.83	+0.25	−0.11
5	13 55 8	−29.27	−29.65	13 55 2	+10.46	+10.33	+0.38	+0.13
14	12 1 43	−29.74	−29.55	12 2 26	+11.74	+11.50	−0.19	+0.24
14	12 26 22	−28.38	−28.56	12 28 16	+11.21	+10.30	+0.18	+0.91
16	10 32 58	−26.93	−26.80	10 32 24	+10.23	+ 9.73	−0.13	+0.50
21	12 2 6	−26.84	−27.28	12 2 6	+11.38	+11.62	+0.44	−0.24
21	12 24 30	−28.40	−28.99	12 24 42	+12.16	+11.85	+0.59	+0.31
31	10 11 1	−25.35	−25.36	10 11 30	+10.81	+10.37	+0.01	+0.44

The differential equations for correcting the elements are as follows:

$$dx = P\cdot du + Q\cdot e \sin\pi + R\cdot e\cos\pi + S\cdot da + T\cdot dN + W\cdot dJ,$$
$$dy = P'\cdot du + Q'\cdot e \sin\pi + R'\cdot e\cos\pi + S'\cdot da + T'\cdot dN + W'\cdot dJ,$$

where

$$P = +v \sin f \cos(F+u),$$
$$P' = +v \sin g \cos(G+u),$$

$$Q = -v \sin f [\cos(F+u)\cos u + \cos F],$$
$$Q' = -v \sin g [\cos(G+u)\cos u + \cos G],$$

$$R = +v \sin f [\cos(F+u)\sin u - \sin F],$$
$$R' = +v \sin g [\cos(G+u)\sin u - \sin G],$$

$$S = \frac{x}{a}, \qquad S' = \frac{y}{a},$$

$$T = +v [\sin h \sin(H+u)\cos\delta - \sin g \sin(G+u)\sin\delta],$$
$$T' = +v \sin f \sin(F+u)\sin\delta,$$

$$W = +v \cos f \sin u,$$
$$W' = +v \cos g \sin u,$$

$$v = \frac{a}{\Delta}\cdot\frac{1}{1+\zeta}.$$

If, as is customary, dx, dy, x, y and a, are in seconds of arc, then the resulting corrections will be expressed in units of the radian with the exception of da, which will be in seconds of arc.

The coefficients P, P', S, S', T, T', W and W' were checked by assigning arbitrary increments to the elements and recomputing the positions of the satellites. If the new values of x_c and y_c are called x'_c and y'_c, then the differences $x'_c - x_c$ and $y'_c - y_c$ must be what is obtained by substituting the values of the increments in

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the differential equations neglecting the terms in $e \sin \pi$ and $e \cos \pi$. The increments chosen were

Radians.	′
$du = 0.01$	$= 34.4$
$dN = 0.01$	$= 34.4$
$dJ = 0.01$	$= 34.4$
″	
$da = 0.05$	

The equations of condition are as follows:

Deimos.

[Equations in x.]

Date.	Log P.	Log Q.	Log R.	Log S.	Log T.	Log W.	Log dx.	Weight p.	$vp.x$
1907									″
June 19	1.7011	1.8675	1.9217_n	0.3524_n	1.7138	0.9228_n	9.8261	1	−0.406
30	1.7509_n	1.2521	2.0826_n	0.3468_n	1.6089_n	1.3817	9.7924	1	+0.144
30	1.6704_n	1.0872	2.0368_n	0.4257_n	1.4842_n	1.3535	9.5798	½	−0.093
July 4	0.2062_n	1.5060	1.8273_n	0.5423_n	1.1107	1.0880	0.1271	1	+0.170
4	1.0638	1.6486	1.7986_n	0.5371_n	1.3877	0.9021	9.9777	1	−0.410
5	1.7670_n	1.3519	2.0925_n	0.3356_n	1.6330_n	1.4136	9.1761_n	½	−0.481
14	1.6453_n	1.2755	2.0213_n	0.4479_n	1.4424_n	1.4185	9.9345	1	+0.165
16	1.1292	1.4317	1.8621_n	0.5331	0.4655_n	1.2768_n	9.9085_n	1	+0.270
16	0.1501_n	1.5852	1.8015_n	0.5403	1.2230_n	1.1499_n	0.0864_n	1	−0.457
21	1.3814	1.3578	1.9073_n	0.5082	0.8718	1.3609_n	9.9345_n	1	+0.347
21	0.5115	1.5482	1.8058_n	0.5328	1.0986_n	1.2199_n	0.1492_n	1	−0.552
30	1.2702_n	1.7466	1.7217_n	0.4976	1.5062_n	0.9527_n	9.8573_n	½	−0.200

Deimos.

[Equations in y.]

Date.	Log P'.	Log Q'.	Log R'.	Log S'.	Log T'.	Log W'.	Log dy.	Weight p.	$vp.x$
1907									″
June 19	1.3466_n	1.5802_n	1.3829	9.5462	1.3326	1.4266_n	0.4425	1	−0.107
30	1.1330	1.1702_n	1.5031	0.0185	1.3407	1.8507	9.9085	1	−0.187
30	0.9609	1.1541_n	1.4341	0.0576	1.4197	1.8224	0.2014	½	−0.051
July 4	0.8139_n	1.3814_n	1.2229	0.0898	1.5411	1.5526	0.4533	1	−0.406
4	1.0572_n	1.4057_n	1.2141	0.0603	1.5361	1.3549	0.4346	1	−0.722
5	1.2108	1.1842_n	1.5575	0.0120	1.3338	1.8624	9.2041_n	½	−0.668
14	1.1068	1.1307_n	1.5311	0.0880	1.4562	1.8315	0.2014	1	−0.065
16	9.7254_n	1.2632_n	1.3612	0.1387_n	1.5428_n	1.6827_n	0.5185_n	1	+0.017
16	0.7293	1.3896_n	1.3016	0.1316_n	1.5500_n	1.5557_n	0.5682_n	1	+0.201
21	0.7865_n	1.1730_n	1.4467	0.1367_n	1.5203_n	1.7509_n	0.5551_n	1	−0.928
21	0.4061	1.3196_n	1.3387	0.1445_n	1.5448_n	1.6097_n	0.6284_n	1	−0.645
30	1.0254	1.4567_n	1.3033	0.1152_n	1.5108_n	1.3230_n	0.6857_n	½	−0.529

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Phobos.

[Equations in x.]

Date.	Log P.	Log Q.	Log R.	Log S.	Log T.	Log W.	Log dx.	Weight p.	$\sqrt{p}.v$
1907									"
June 21	0.9520_n	0.6739	1.5030_n	0.4955_n	0.4871_n	0.7784	9.5441	1	+0.523
21	0.3143	1.1203	1.3985_n	0.5177_n	0.8268	0.4645	9.5911_n	1	−0.268
30	0.8385_n	0.8662	1.4885_n	0.5255_n	9.8613_n	0.7964	8.7782_n	1	+0.093
30	0.6389	1.2267	1.4006_n	0.5330_n	0.9661	0.4640	8.9031	1	+0.189
30	1.1778	0.6450	1.5911_n	0.4716	0.9303	0.9176_n	9.5441_n	½	−0.092
July 3	9.3562_n	1.1266	1.4212_n	0.5415	0.7677_n	0.6540_n	8.6021_n	½	+0.030
3	0.9495_n	1.3420	1.3995_n	0.5209	1.1226_n	0.2038_n	9.3979_n	½	−0.061
5	0.1496	1.1699	1.4126_n	0.5427_n	0.8458	0.6371	9.5798_n	1	−0.271
14	0.3081_n	1.1125	1.4293_n	0.5412_n	0.6283	0.8006	9.2788	1	+0.287
14	0.8957	1.3478	1.3767_n	0.5264_n	1.1143	0.4491	9.2553_n	1	−0.098
16	1.0910	1.4330	1.3860_n	0.4987_n	1.2253	0.0425	9.1139	1	+0.211
21	0.9954_n	0.9530	1.5116_n	0.5064_n	0.5151_n	0.9652	9.6434_n	1	−0.343
21	0.0655_n	1.1517	1.4047_n	0.5329_n	0.5850	0.8172	9.7708_n	1	−0.549
31	1.0336	1.4107	1.3253_n	0.4748_n	1.1946	0.3179	8.0000_n	1	+0.048

Phobos.

[Equations in y.]

Date.	Log P'.	Log Q'.	Log R'.	Log S'.	Log T'.	Log W'.	Log dy.	Weight p.	$\sqrt{p}.v$
1907									"
June 21	9.9927_n	0.8910_n	0.7594	0.0470	1.0782	1.2683	9.4914	1	+0.165
21	0.6550_n	1.0534_n	0.6904	9.9940	1.0993	0.9659	9.4314	1	+0.509
30	9.9276_n	0.8972_n	0.8386	0.0853	1.1191	1.2687	9.5441	1	+0.228
30	0.6687_n	1.0677_n	0.7806	0.0378	1.1277	0.9435	8.8451_n	1	+0.203
30	0.0978_n	0.8099_n	0.9257	0.0841_n	1.0882_n	1.3561_n	0.7782_n	½	−0.223
July 3	0.4872	1.0019_n	0.8080	0.0802_n	1.1395_n	1.1167_n	8.7782	½	−0.037
3	0.7777	1.1211_n	0.8364	0.0168_n	1.1189_n	0.6608_n	9.0414	½	−0.302
5	0.5279_n	1.0171_n	0.8220	0.0849	1.1431	1.0856	9.1139_n	1	+0.020
14	0.1485_n	0.9359_n	0.9090	0.1314	1.1502	1.2070	9.3802_n	1	−0.258
14	0.7244_n	1.1010_n	0.8869	0.0836	1.1318	0.8149	9.9590_n	1	−0.560
16	0.8124_n	1.1436_n	0.9213	0.0588	1.1102	0.4823	9.6990_n	1	−0.040
21	0.4102	0.7686_n	1.0517	0.1356	1.1187	1.3551	9.3802	1	−0.123
21	0.0288_n	0.9223_n	0.9376	0.1443	1.1452	1.2070	9.4914_n	1	−0.347
31	0.7539_n	1.1121_n	0.9188	0.0865	1.0870	0.6705	9.6434_n	1	−0.067

The equations in x and those in y were solved together, giving equal weight to each set. Before solving, the coefficients were made more nearly homogeneous by multiplying by certain factors. In the equations for Deimos, R and R' were multiplied by ½; S and S' by 10. In the equations for Phobos, P and P' were multiplied by 2; S and S' by 5.

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The resulting normal equations in natural numbers follow:

Deimos.

du	$e \sin \pi$	$2e \cos \pi$	$\frac{1}{3} da$	dN	dJ	C–O n
+12860.7	−2377.6	−5397.7	−3339.3	−8401.6	−2109.5	−168.95
	−20432.6	−16264.8	−562.5	−945.0	−714.7	−66.16
		−20675.5	−2340.9	−4141.4	−549.9	−100.98
			−11355.3	−2576.2	−608.9	−54.97
				−18318.0	−10975.0	−996.35
					−29198.0	−1156.70

Phobos.

$\frac{1}{2} du$	$e \sin \pi$	$e \cos \pi$	$\frac{1}{3} da$	dN	dJ	C–O n
+3723.6	−1918.1	−764.4	−636.9	−500.7	−840.5	−22.19
	−4790.3	−5713.4	−3006.8	−121.2	−483.5	−0.35
		−10071.2	−4546.6	−589.0	−275.2	−29.78
			−3852.0	−239.6	−14.1	−9.31
				+3242.9	−2216.2	−22.84
					−2797.4	−0.44

The solutions of these normal equations give the following results:

Deimos.

Mean Epoch: 1907, July 0.0, Greenwich Mean Time.

Corrections. Radians.	*Corrected Elements.*	
$du = +0.07790 \pm 0.00520$	$u = 251^\circ.73 \pm 0^\circ.30$	Equator.
$dN = -0.08313 \pm 0.00377$	$N = 43.42 \pm 0.22$	
$dJ = -0.00332 \pm 0.00252$	$J = 37.75 \pm 0.14$	
$e \sin \pi = -0.01942 \pm 0.00531$	$\pi = 251.0$	
$e \cos \pi = -0.00669 \pm 0.00276$	$e = 0.0205$	
$da = -0''.069 \pm 0''.032$	$a = 32''.441 \pm 0''.032$	

$[pv^2] = 4''.232$

Probable error of one observation of weight unity $= \pm 0''.327$.

Phobos.

Mean Epoch: 1907, July 0.0, Greenwich Mean Time.

Corrections. Radians.	*Corrected Elements.*	
$du = -0.02924 \pm 0.01012$	$u = 96^\circ.16 \pm 0^\circ.58$	Equator.
$dN = +0.02657 \pm 0.00632$	$N = 49.70 \pm 0.36$	
$dJ = -0.02650 \pm 0.00692$	$J = 36.42 \pm 0.40$	
$e \sin \pi = -0.00377 \pm 0.00712$	$\pi = 213.6$	
$e \cos \pi = -0.00568 \pm 0.00450$	$e = 0.0068$	
$da = +0''.003 \pm 0''.025$	$a = 12''.953 \pm 0''.025$	

$[pv^2] = 2''.078$

Probable error of one observation of weight unity $= \pm 0''.207$.

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The eccentricity of Deimos derived from this discussion is relatively large, while that of Phobos is very small. This result is just the reverse of what has usually been obtained. The determination of the quantities e and π for these satellites is very uncertain, and especially so when the number of observations is small, as at the opposition of 1907. It is interesting, however, to see how these results satisfy the theory of Prof. HERMANN STRUVE as given in his very complete investigation of the orbits of the satellites of Mars (Mem. de l'Acad. Imp. des Sciences de St. Petersbourg, VIII Ser., Vol. VIII, No. 3).

The pole of the orbit plane of Deimos describes a circle about a fixed point, and the motion is in the retrograde direction and proportional to the time. If we take, as did STRUVE, this fixed point as the pole of a fixed plane whose coordinates are $N_1=46°.25, J_1=36°.88$ and refer the elements of Deimos to the equinox 1880.0; and further, if γ is the spherical radius of this circle and θ the angle which the radius makes with a great circle drawn through the pole of the fixed plane and that of the Earth's equator, we shall find for the epoch 1907.50,

$$\theta = 298°$$
$$\gamma = 2.12$$

The pole of the orbit plane of Deimos has described in 30 years an arc of 201° or, in other words, the line of nodes of the orbit plane of Deimos moves yearly through an arc of approximately 6°.7 on the fixed plane $N_1 J_1$. This is in good agreement with the result obtained by STRUVE.

Further, the line of apsides of the orbit of Deimos changes by an amount equal to between 6° and 7° yearly. The empirical formula $\pi_D = 89° + 6°.64\ (t - 1880.0)$ represents the motion as follows, neglecting the effect of precession:

Epoch.	π_D	
	Obs.	Comp.
	°	°
1877.69	41	74
1879.86	121	88
1894.79	184	187
1896.92	226	201
1907.50	251	272

This result also agrees well with that derived by STRUVE.

The motion of the line of apsides of Phobos should be nearly 25 times that of Deimos, or approximately 165° yearly. STRUVE finds that the results included in his discussion can best be represented by two assumptions.

I. $\Delta\pi_P = 158°$
II. $\Delta\pi_P = 179°$

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If the value of π for 1907 be compared with those in his memoir, we shall have after reducing to the epoch 1894.79 with the two assumed motions,

Epoch.	π_P	
	I	II
	°	°
1877.68	229	228
1879.85	285	239
1892.60	237	283
1894.79	225	225
1896.94	221	176
1907.50	6	99

As we see, neither assumption represents the value determined in 1907. The empirical formula $\pi_P = 103° + 177°(t - 1880.0)$ represents all the results as follows, neglecting the effect of precession:

Epoch.	π_P	
	Obs.	Comp.
	°	°
1877.68	46	52
1879.85	84	76
1892.60	251	173
1894.79	225	201
1896.94	201	221
1907.50	214	289

However, owing to the uncertainty inherent with the determination of π, and since the approaching opposition of Mars in 1909 is a very favorable one, it seems advisable to wait for more material before attempting to improve the theory.

The equations of condition for Deimos were solved by Assistant R. M. PACKARD and those of Phobos by Assistant J. B. EPPES under the supervision of Prof. ASAPH HALL, jr., U. S. Navy, who is at present in charge of the equatorial department, and I am much indebted to them for their care and interest taken in this work.

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ORBIT OF ENCELADUS.

BY

H. R. MORGAN.

FROM

OBSERVATIONS

MADE BY

T. J. J. SEE IN 1901.

28167°—VOL 6—11——27 B 29

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ORBIT OF ENCELADUS.

The observations used in computing this orbit were made by Prof. T. J. J. See, U. S. Navy, with the 26-inch equatorial of the United States Naval Observatory, in 1901. Since the observation of August 17 was incomplete, and that of June 18 gave a residual of 4″, they have been discarded. On nine nights of "bad" seeing the observations were given less weight than the other measures in the discussion.

The mass of Saturn was considered as known, and the distances of the satellites were derived therefrom. The peri-saturnium of Enceladus as derived from theory is $\Pi = 2\, l_{DI} - l_{En}$, and no correction to this value has been introduced into the solution that follows.

The formulæ used are given by Hermann Struve (Publications de Poulkova, Série II, Vol. XI) as are also the assumed elements, with the exception of the mean longitudes. The longitudes are reckoned on Saturn's equator as the fundamental plane, from its node, N_1, on the Earth's equator, to the node of the satellite's orbit, θ, and thence along the orbit.

u = true longitude in orbit.
ϵ = mean longitude in orbit.
e, π = eccentricity, and longitude of peri-saturnium.
γ, θ = inclination, and longitude of node.
n = mean daily motion.
a = semi-major axis of satellite's orbit, at the mean distance ρ of Saturn from the Earth.
J_1, N_1 = inclination, and longitude of node of Saturn's equator on Earth's equator, reckoned from the equinox.

Assumed Elements.

Epoch: 1901.516 = July 8.0, Greenwich Mean Time.

Saturn's equator $\begin{cases} N_1 = 126^\circ\ 26'.6 \\ J_1 = 6^\circ\ 55'.6 \end{cases}$
Mass $= \mu = 3495.3$

Enceladus.	Tethys.
$u_0 = \epsilon_0 = 175^\circ.984$	$u_0 = \epsilon_0 = 36^\circ.694$
$\Delta\epsilon_0 = +0^\circ.268$	$\Delta\epsilon_0 = +0^\circ.062$
$e =$	$e = 0.0$
$\pi_0 = 257^\circ.28$	$\pi_0 =$ .....
$\Delta\pi = +123^\circ.43\ (t - 1901.516)$	$\Delta\pi =$ .....
$\gamma = 0'.0$	$\gamma = 64'.36$
$\theta_0 =$	$\theta_0 = 177^\circ.0$
$\Delta\theta = -152^\circ.7\ (t - 1901.516)$	$\Delta\theta = -72^\circ.5\ (t - 1901.516)$
$n = 262^\circ.73199$	$n = 190^\circ.69795$
$a = 34''.416$	$a = 42''.605$

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$$\text{...} = \Delta\varepsilon = \begin{cases} +11'.24 \sin\{143^\circ + 92^\circ.4(t - 1889.25)\} \\ +20'.00 \sin\{75^\circ + 29^\circ.3(t - 1889.25)\}. \end{cases}$$

$$\Delta\varepsilon = \begin{cases} -141'.6 \sin 5^\circ.1(t - 1866.50) \\ +2'.5 \sin 15^\circ.3(t - 1866.50). \end{cases}$$

Formulæ.

... Saturn referred to Earth's equator and center.
... Saturn referred to Earth's center and Saturn's equator.
... Saturn's pole.
... referred to Saturn's equator and center.
... angle observed.

$$\ldots \sin(p - P),$$
$$\ldots \cos(p - P),$$

$$\cos(p - P)\, d(y_1 - y_2),$$

$$\ldots \sin(\alpha - N_1) \cos J_1 + \sin\delta \sin J_1,$$
$$\ldots \cos(\alpha - N_1),$$
$$\ldots \sin(\alpha - N_1) \sin J_1 - \sin\delta \cos J_1,$$
$$\ldots \cos(\alpha - N_1),$$
$$\ldots \sin(\alpha - N_1) \sin J_1 + \cos\delta \cos J_1,$$

$$\ldots \sin\gamma \sin(u - \theta_0 - \Delta\theta) \cos B,$$

$$\log(\rho) = 0.97950,$$

$$\ldots \sin 1''.$$

Tethys.

$$dx_2 = +\nu_2 \cos(u_2 - U) \cdot d\varepsilon_2.$$

$$\ldots \pi_1\}.$$

$$dy_2 = -\nu_2 \sin(u_2 - U) \sin B \cdot d\varepsilon_2.$$

$$\ldots \cos(\ldots \pi_1)\}$$

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Observations.

Date.	Observed.			Computed.				O–C	
	Washington Mean Time.	p	s	x_1	x_2	y_1	y_2	x_1-x_2	y_1-y_2
1901	h m	°	″	″	″	″	″	″	″
Apr. 26	15 27.9	215.61	6.42	+28.21	+24.12	− 7.67	−13.34	−1.03	−0.02
27	15 46.6	283.38	32.15	+16.92	−15.73	+11.98	+15.31	−0.68	−0.14
28	16 2.3	128.29	43.93	−30.74	+ 6.71	+ 5.95	−16.49	−0.17	+0.26
29	15 49.9	24.41	30.30	− 9.38	− 0.06	−13.32	+16.82	+0.35	+1.21
May 4	15 29.9	262.92	66.69	+31.44	−33.01	+ 5.66	−11.22	+0.17	−0.44
13	14 38.4	107.08	63.21	−34.47	+27.31	− 2.04	−12.94	−0.50	−0.02
14	14 48.6	321.94	40.03	+ 8.22	−19.74	−13.83	+15.07	+0.46	+0.70
15	14 27.3	225.47	27.90	+31.72	+14.29	+ 5.96	−16.14	−0.14	−0.20
22	14 35.7	14.89	13.94	+33.83	+36.63	− 4.05	+10.11	+0.93	+0.35
23	14 7.2	248.32	47.28	+ 2.41	−39.29	+14.40	− 8.31	−0.28	+0.10
28	13 34.2	95.26	68.49	−27.94	+40.31	− 8.99	− 6.43	−0.20	+0.29
June 4	12 41.2	67.24	42.23	−35.40	+ 1.39	− 2.09	+17.96	+0.18	−1.00
9	13 18.7	278.95	59.70	+21.77	−38.74	−11.80	− 9.49	−0.83	+0.41
10	12 53.4	109.26	18.74	+23.53	+41.26	+11.22	+ 7.44	−0.59	+0.16
19	12 15.9	39.82	28.94	−31.11	−15.28	− 7.65	+16.98	+0.19	+0.29
24	11 50.9	265.84	58.28	+34.30	−22.84	− 4.88	−16.24	+0.01	+0.02
27	12 35.8	70.69	50.89	− 3.46	+41.88	−15.07	+ 7.34	−0.24	−0.21
28	11 14.1	268.04	77.47	+34.76	−41.88	+ 4.34	− 7.36	−0.14	+0.47
30	10 46.6	302.33	17.21	−29.35	−44.84	− 8.92	− 1.78	+0.07	−0.20
July 3	10 45.8	109.69	72.97	−30.71	+39.31	+ 8.12	− 8.37	−1.18	−0.55
5	11 19.5	225.41	10.92	+33.16	+25.79	− 6.21	−14.85	−0.59	−0.08
9	10 42.5	246.71	43.98	+35.57	− 2.50	+ 3.04	−18.70	−0.11	+0.48
10	10 22.0	83.79	22.73	−13.83	+ 8.76	+14.12	+18.47	+0.47	−0.86
15	9 57.0	287.21	23.34	−16.48	−39.54	−13.63	− 9.50	−0.09	+0.01
15	11 20.9	294.15	19.02	−24.43	−42.88	−11.31	− 6.20	−0.27	−0.49
20	10 16.8	167.17	10.38	+36.02	+39.43	+ 1.42	− 8.24	−0.11	+0.10
21	9 40.8	267.73	25.07	−11.82	−36.98	+14.48	+ 9.96	−0.42	−0.48
23	9 48.4	308.85	52.17	+19.20	−24.47	−12.98	+15.30	+0.65	+0.76
29	9 33.2	83.01	59.29	−35.21	+21.82	+ 3.15	+16.72	−0.50	−0.75
31	8 25.4	341.18	11.41	+34.70	+29.68	+ 3.95	+14.46	−0.05	+0.24
Aug. 1	10 30.1	248.89	47.98	+ 0.38	−41.51	+15.30	− 7.36	+0.43	−0.07
2	9 26.0	88.18	77.73	−34.04	+42.06	− 4.81	+ 6.67	−0.72	−0.41
7	9 12.1	291.90	68.90	+29.91	−36.91	− 8.33	+ 9.68	−0.25	+0.25
8	10 2.1	169.48	27.90	+20.42	+27.96	+12.50	−14.02	−0.84	+0.09
9	9 7.8	47.38	13.12	−33.91	−25.75	+ 4.66	+14.75	−0.35	+0.10
18	10 1.1	281.18	62.01	+21.49	−40.43	−12.01	− 7.66	−0.09	−0.23
19	8 35.7	109.72	23.59	+17.38	+40.20	+13.16	+ 7.83	−0.19	−0.11
20	8 28.7	230.27	13.51	−32.81	−42.42	+ 5.44	− 4.84	−0.34	−0.45
21	8 39.8	80.98	55.64	− 9.60	+43.45	−14.53	+ 0.94	−0.45	+0.18
22	7 55.3	277.38	78.12	+35.06	−43.28	− 0.13	+ 0.63	−0.22	+0.15
26	7 37.5	280.60	60.24	+29.65	−30.69	+ 7.91	+12.47	−0.22	+0.71
27	7 17.4	123.03	56.46	−23.61	+26.11	+11.03	−14.24	−0.98	−0.43
28	7 48.9	24.16	28.80	−24.93	−16.38	−10.45	+16.76	+0.02	−0.30
29	8 12.3	253.76	20.40	+25.48	+ 6.41	−10.17	−18.10	−0.32	+0.09
30	7 34.3	292.78	19.09	+16.60	− 2.17	+13.13	+18.32	−0.40	−0.03
Sept. 3	7 56.5	98.12	26.63	+ 2.15	+29.01	+14.85	+13.90	+0.22	−0.39
4	7 56.5	185.32	10.29	−34.34	−34.25	− 0.96	−11.44	−0.20	−0.20
6	8 4.6	269.74	74.46	+32.85	−41.20	+ 4.27	− 5.10	−0.15	−0.07
7	7 38.1	106.48	59.38	−16.54	+42.09	+12.95	+ 2.87	+0.09	−0.21
9	6 58.5	71.74	17.21	+26.41	+41.70	− 9.35	− 2.25	−0.28	−0.22
12	8 19.8	350.76	26.64	−18.16	−25.81	−12.42	+13.85	−0.24	+0.68

The corrections for the reduction of s to time of p: Aug. 18, +0″.40, Aug. 21 −0″.30 have been applied.

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Weighted Equations of Condition in (x_1-x_2).

Date	[illegible]	[illegible]	$d\varepsilon_2$	v	$\sqrt{p}$
				"	
[illegible]	[illegible]	[illegible]	1.2340	−0.42	[illegible]
	[illegible]	[illegible]	1.[illegible]	−0.56	1
[illegible]	[illegible]	[illegible]	[illegible]	−0.10	1
[illegible]	[illegible]	[illegible]	[illegible]	−0.10	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	−0.3[illegible]	1
	[illegible]	[illegible]	[illegible]	−0.[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	−0.[illegible]	1
[illegible]	[illegible]	[illegible]	[illegible]	−[illegible]	[illegible]

Weighted Equations of Condition in $(y_1 - y_2)$.

Date.	de_1	c_1	$d(\gamma_1 \sin\theta_{01})$	$d(\gamma_1 \cos\theta_{01})$	de_2	v	$\sqrt{p}$
1901						″	
Apr. 26	0.7589$_n$	0.8561$_n$	0.5262	1.1801$_n$	0.6916	−0.07	½
27	0.8373$_n$	9.7355$_n$	1.4751	0.9304	0.8058$_n$	0.00	1
28	1.0968	1.1403$_n$	1.0245$_n$	1.4662	0.4360	+0.49	1
29	0.2805	9.9255$_n$	1.1345$_n$	0.8778$_n$	8.1091$_n$	+0.51	½
May 4	1.1068$_n$	0.5030$_n$	1.4602	1.0929$_n$	1.1280$_n$	−0.46	1
13	1.1476	0.7307$_n$	1.3711$_n$	1.3310	1.0466	+0.11	1
14	0.5252$_n$	0.8435$_n$	1.2867$_n$	1.4032$_n$	0.9057$_n$	+0.46	1
15	1.1119$_n$	0.0860$_n$	1.4548	1.1559$_n$	0.7654	−0.20	1
22	0.8399$_n$	0.6742$_n$	0.7324	1.1806$_n$	0.8744	+0.12	½
23	9.9943$_n$	0.2776$_n$	1.4380	1.2280	1.2061$_n$	+0.27	1
28	1.0589	0.4920	1.4883$_n$	1.0038	1.2182	+0.30	1
June 4	0.8624	9.8276$_n$	1.0147$_n$	1.1003	9.4551	−0.44	½
9	0.6526$_n$	0.6426$_n$	0.8107$_n$	1.1771$_n$	0.9028$_n$	+0.07	½
10	0.9876$_n$	0.7589	1.5059	0.8263$_n$	1.2315	+0.24	1
19	1.1112	0.7994	1.4388$_n$	1.2577	0.8025$_n$	+0.30	1
24	1.1550$_n$	0.5907$_n$	0.4917	1.5159$_n$	0.9784$_n$	−0.22	1
27	0.1596	0.3331	1.4969$_n$	1.0019$_n$	1.2425	−0.35	1
28	1.1619$_n$	0.7567	1.3217	1.4054$_n$	1.2428$_n$	+0.29	1
30	1.0890	0.9500	1.4476$_n$	1.2393	1.2731$_n$	−0.24	1
July 3	0.8085	0.3517$_n$	0.5005	1.2089	0.9158	−0.12	½
5	1.1435$_n$	0.4340$_n$	1.3075$_n$	1.5172$_n$	1.0344	−0.35	1
9	1.1751$_n$	0.8414	1.2248	1.4523$_n$	0.0216$_n$	+0.30	1
10	0.4642	0.1575$_n$	1.0926	1.0353	0.2656	−0.30	½
15	0.8427	0.9713	1.5102$_n$	0.7533	1.2226$_n$	−0.14	1
15	1.0135	1.0581	1.4730$_n$	1.1468	1.2579$_n$	−0.57	1
20	1.1835$_n$	0.8944	1.0644	1.4863$_n$	1.2228	−0.07	1
21	0.7001	9.9614$_n$	1.4328	1.2646	1.1953$_n$	−0.29	1
23	0.9112$_n$	0.3360$_n$	1.3525$_n$	1.3753$_n$	1.0164$_n$	+0.49	1
29	1.1759	0.7200	9.3899$_n$	1.5126	0.9681	−0.51	1
31	1.1701$_n$	1.0846	1.1619	1.4634$_n$	1.1023	+0.07	1
Aug. 1	9.2120$_n$	0.6682	1.5037	0.7767	1.2481$_n$	+0.02	1
2	1.1622	1.1174	1.1991$_n$	1.4519	1.2541	−0.25	1
7	1.1071$_n$	0.3218	1.1170$_n$	1.4695$_n$	1.1984$_n$	−0.06	1
8	0.6406$_n$	0.8337	1.1598	0.8522$_n$	0.7770	+0.03	½
9	1.1619	0.7718	0.7221	1.5017	1.0424$_n$	+0.30	1
18	0.9654$_n$	0.2267	1.3695$_n$	1.3335$_n$	1.2399$_n$	−0.52	1
19	0.8735$_n$	1.1345	1.4596	1.1263$_n$	1.2376	−0.11	1
20	1.1496	0.8529	0.9613	1.4828	1.2612$_n$	−0.26	1
21	0.6158	1.0188	1.4917$_n$	0.8158	1.2717	+0.13	1
22	1.1787$_n$	1.1062	0.2316	1.4997$_n$	1.2702$_n$	−0.16	1
26	1.1064$_n$	1.2471	1.2434	1.4174$_n$	1.1214$_n$	+0.49	1
27	0.7066	0.2221	1.0506	1.0409	0.7502	−0.08	½
28	1.0313	1.2337	1.3495$_n$	1.3424	0.8491$_n$	−0.29	1
29	1.0409$_n$	0.6205	1.3208$_n$	1.3675$_n$	0.4418	−0.16	1
30	0.8549$_n$	1.1533	1.4406	1.1684$_n$	9.9721$_n$	−0.09	1
Sept. 3	9.9685$_n$	0.9139	1.4910	0.4045$_n$	1.0978	−0.29	1
4	1.1711	1.1949	0.0735$_n$	1.4916	1.1700$_n$	−0.06	1
6	1.1520$_n$	1.2561	0.8877	1.4765$_n$	1.2503$_n$	−0.37	1
7	0.8540	0.6087	1.4427	1.1341	1.2597	+0.02	1
9	1.0574$_n$	0.7970	1.3210$_n$	1.3536$_n$	1.2557	−0.44	1
12	0.8948	1.1989	1.3883$_n$	1.2667	1.0474$_n$	+0.65	1

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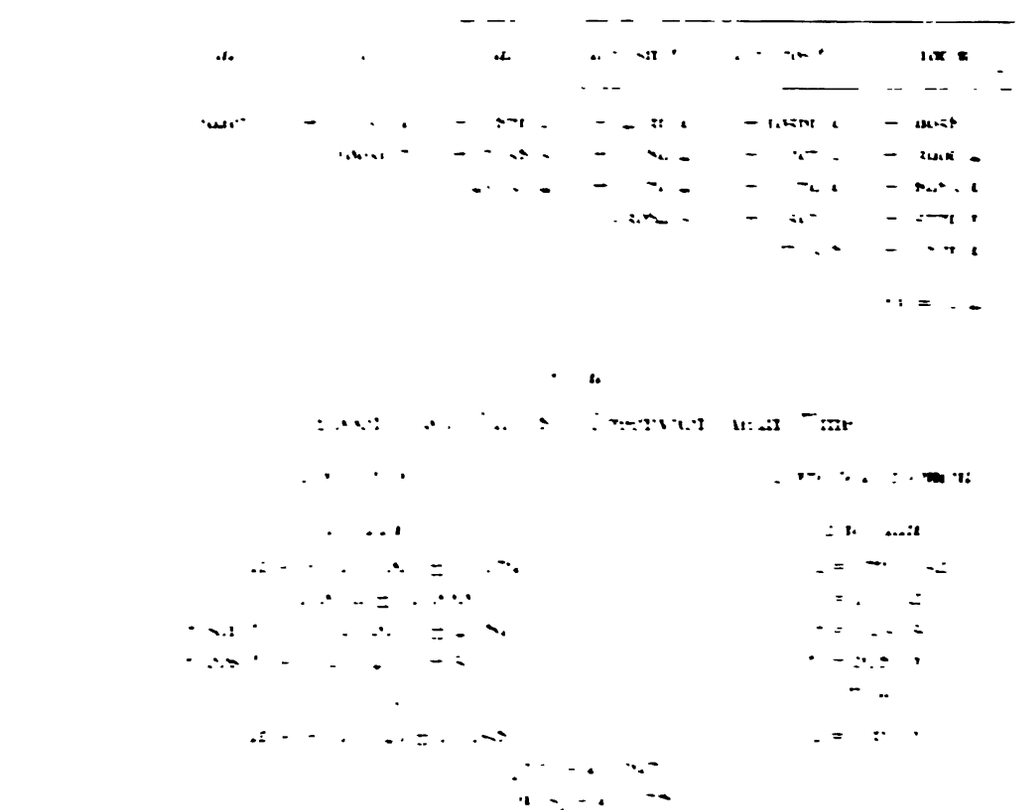
Normal Equations.



A DETERMINATION

OF

THE SOLAR PARALLAX.

BY

C. W. FREDERICK.

FROM

OBSERVATIONS OF EROS

MADE BY

T. J. J. SEE IN 1900–1901.

B 37

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A DETERMINATION OF THE SOLAR PARALLAX.

In connection with the campaign planned by the Paris Conference of July, 1900, for the determination of the solar parallax, the visual observations of Eros, made with the 26-inch equatorial at Washington during the opposition of 1900 and 1901, were printed in Publications of the United States Naval Observatory, Second Series, Volume III. The results there given, pages A 69–A 72, are differences between the asteroid and near-by comparison stars, the positions of the latter not being known, but according to the plan of the Conference they were to be determined photographically in the course of the Eros work. These places have now become available, making it possible to complete the reduction of the observations.

However, there are certain small changes that have been made in the published results, and a few material errors have been discovered. Since these changes affect the majority of the observations, it was thought best to reprint the entire series. The changes in question have to do with the small corrections which depend upon the orientation of the micrometer. These corrections were all recomputed, the formulæ used for the purpose being as follows:

$\epsilon_\alpha = +\Delta\delta(\lambda + 0.00120 - \sin 0°.52)$; $\epsilon_\delta = -\Delta\alpha(\lambda + 0.00120 - \sin 0°.52)$, for the first twelve observations.

$\epsilon_\alpha = +\Delta\delta(\lambda + 0.00120)$; $\epsilon_\delta = -\Delta\alpha(\lambda + 0.00120)$, for all observations after the twelfth.

where

$\epsilon_\alpha, \epsilon_\delta$ = the corrections in right ascension, and in declination, respectively.

$\Delta\delta$ = the difference in declination between the asteroid and star at the time of the measurement in right ascension.

$\Delta\alpha$ = the difference in right ascension between the asteroid and star at the time of the measurement in declination.

λ = the sine of the error of the micrometer in orientation; this quantity was taken from the table on page F 99 of Publications of the United States Naval Observatory, Second Series, Volume IV, Appendix III.

The number + 0.00120 is added to λ because of the manner in which the micrometer was oriented; this was done by trailing equatorial stars with the telescope *west* of the pier, the table being based upon the assumption that the orientation is made with the telescope *east* of the pier. The quantity $-\sin 0°.52 = -0.00908$ must be included for the reduction of the first twelve observations because of an error of 0°.52 which was made in setting the micrometer in these observations. In cases of change, other than the above, the quantities in question are noted at the foot of the page of observations.

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Revised Rectangular Coordinates (Asteroid − Star.)

No.	Date.	Washington Mean Time.	$\Delta\alpha \cos\delta$	Washington Mean Time.	$\Delta\delta$
	1900	h m s	"	h m s	"
1	Oct. 9	7 28 34.2	− 29.316	7 34 29.8	+ 40.952
2	9	7 40 35.6	+ 53.538	7 44 39.6	− 17.500*
3	9	8 33 8.1	+ 43.717	8 37 26.2	+ 31.032
4	9	8 43 0.8	− 46.790	8 47 15.1	− 1.831
5	9	17 28 21.4	− 37.997	17 33 1.8	+ 48.603
6	9	17 38 47.5	− 40.383	.. ..	.....
7	10	7 13 29.0	+ 16.311	7 16 56.9	− 2.319
8	10	7 36 6.5	+ 11.960	7 40 6.9	+ 18.678
9	10	8 21 41.2	+ 2.818	8 25 52.6	+ 60.112
10	10	16 18 2.1	− 19.277	16 24 53.2†	− 42.499
11	10	16 31 57.0	− 22.896	16 38 8.1	− 31.126
12	10	16 48 40.0	− 27.173	16 53 1.5	− 18.933
13	11	8 20 5.9	+158.245‡	8 28 18.1	+ 54.563‡
14	11	8 49 32.2	+ 83.944‡	8 53 42.9	+ 21.163‡
15	11	16 31 9.3	+ 15.918‡	16 35 50.8	+ 70.514‡
16	11	16 50 12.2	+ 11.171‡	16 54 7.3	+ 85.535‡
17	15	6 37 10.7	+ 16.572	6 40 36.0	+ 14.645
18	15	6 44 34.3	+ 14.450	6 48 58.0	+ 21.687
19	15	6 53 43.7	+ 11.130	6 56 41.0	+ 27.896
20	15	8 32 46.6	− 22.762	8 37 19.8	+112.304
21	15	8 43 34.6	+ 2.440	8 47 1.6	+ 35.188
22	15	16 34 2.1	− 15.215	16 39 16.1	+ 68.604
23	15	16 52 24.8	+ 22.792	16 57 48.1	−117.189
24	15	17 13 59.8	+ 14.307	17 18 12.6	−101.605
25	16	6 55 26.0	+109.729	6 59 16.8	+ 14.919
26	16	7 33 4.0	+ 71.868	7 36 39.6	− 45.735
27	16	8 34 2.6	+ 49.062	8 39 4.0	+ 4.717
28	16	16 55 47.9	− 62.989	17 0 31.1	+ 51.885
29	16	17 12 34.7	− 69.772	17 17 10.9	+ 63.940
30	17	6 7 30.7	+ 16.171	6 10 56.9	− 25.871
31	17	6 15 17.4	+ 17.293	6 18 34.4	+ 46.723
32	17	6 22 36.1	+ 10.890	6 25 45.7	− 13.767
33	17	16 23 39.4	−140.383	16 29 21.1	− 19.829
34	17	17 6 37.1	+ 26.012	17 10 29.4	− 54.716
35	18	6 17 53.9	+104.755	6 23 2.9	+109.556
36	18	6 30 5.9	− 28.292	6 34 34.8	− 77.742
37	18	8 6 52.7	− 69.039	8 10 52.1	− 1.616
38	18	16 15 19.8	+ 34.680	16 19 33.3	+ 17.494
39	18	16 30 24.0	+ 27.249	16 34 24.3	+ 27.139
40	18	17 3 59.0	+ 11.238	17 7 43.6	+ 50.005
41	18	17 17 13.8	+ 6.075	17 20 54.3	+ 58.919
42	19	6 22 0.8	− 66.142	6 26 22.7	− 29.605
43	19	7 33 17.1	− 98.178	7 37 23.6	+ 25.108
44	19	7 55 44.1	−108.199	7 59 51.1	+ 42.686
45	19	16 15 57.6	− 3.144	16 19 47.6	− 33.500
46	19	17 4 44.4	− 27.203	17 7 46.9	− 1.373
47	19	17 21 52.9	− 35.360	17 25 15.9	+ 9.819
48	20	6 2 9.3	+ 68.512	5 58 16.9	− 96.112
49	20	8 1 28.6	+ 11.763	8 4 17.9	− 2.261
50	20	8 11 47.1	+ 6.660	8 15 1.3	+ 5.709
51	20	8 29 7.9	− 1.770	8 31 49.3	+ 18.171
52	20	16 23 43.0	+ 34.560	16 30 2.3	− 23.013
53	20	17 6 59.4	+ 11.315	17 11 10.8	+ 3.023
54	21	6 38 35.3	+ 4.689	6 41 41.5	+ 20.108
55	21	6 52 16.7	− 1.560	6 55 17.0	+ 30.133
56	21	8 7 3.7	− 40.125	8 10 36.7	+ 84.174
57	22	6 18 49.9	+ 52.545	6 22 9.4	+ 59.537
58	22	7 19 49.9	+ 20.086	7 23 35.4	+102.788
59	24	6 29 43.6	− 12.374	6 33 15.3	− 35.644
60	24	6 37 36.8	− 43.019	6 40 47.6	+ 48.985

* Sign of $\Delta\delta$ changed from that originally published.
† Time of $\Delta\delta$ increased 5^m from that originally published.
‡ Correction for large error in parallel for Nos. 1–12 was originally incorrectly applied to Nos. 13–16.

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Revised Rectangular Coordinates (*Asteroid* − *Star*)—Continued.

No.	Date.	Washington Mean Time.	$\Delta\alpha \cos\delta$	Washington Mean Time.	$\Delta\delta$
	1900	h m s	″	h m s	″
61	Oct. 24	8 32 48.0	− 85.475	8 36 44.0	+ 43.809
62	24	16 37 42.0	− 29.750	16 42 43.0	− 59.818
63	24	17 19 5.3	− 54.338	17 25 21.0	− 38.000
64	26	8 39 2.7	+ 20.416	8 42 15.5	− 51.529
65	27	6 28 22.7	+ 64.607	6 31 33.7	+ 72.464
66	27	6 35 17.6	− 43.913	6 38 16.7	+ 36.505
67	27	7 59 16.7	+ 4.815	8 3 14.9	+123.018
68	29	6 25 5.3	− 35.069	6 28 28.7	+ 29.931
69	29	7 13 34.9	− 68.973	7 16 57.3	+ 52.969
70	29	7 32 30.1	+ 66.693	7 36 37.2	− 21.612
71	29	16 14 19.7	+ 54.788	16 18 27.0	− 27.463
72	29	17 1 23.4	+ 21.778	17 4 42.7	− 10.839
73	29	17 16 48.4	+ 11.425	17 19 42.4	− 5.478
74	30	7 21 14.3	+ 70.300	7 26 1.4	−189.630
75	30	7 30 40.5	− 18.204	7 33 51.5	+ 16.808
76	30	8 10 47.6	+ 34.309	8 15 20.1	−167.899
77	Nov. 4	6 33 12.7	−107.000	6 36 50.2	− 30.477
78	4	7 24 53.2	−146.425	7 29 48.9	− 17.038
79	4	7 55 12.9	−170.637	8 0 8.2	− 9.799
80	5	5 44 24.7	−193.875	5 49 22.3	+137.810
81	5	6 1 2.5	− 8.241	5 55 29.3	+138.806
82	5	7 48 14.7	− 92.054	7 52 36.0	+163.003
83	5	16 24 54.0	− 23.426	16 28 35.5	+ 75.560
84	5	16 34 58.3	− 47.198	16 31 44.5	− 29.625
85	5	17 12 20.0	+ 67.070	17 16 17.0	+131.478
86	6	5 52 8.6	− 42.603	5 55 3.4	+ 24.739
87	6	7 33 24.6	−122.069	7 37 8.4	+ 42.795
88	6	16 24 3.4	− 36.237	16 27 31.4	+ 27.265
89	6	17 3 39.2	− 66.483	17 7 5.9	+ 28.738
90	7	5 39 34.6	−147.410	5 43 45.9	− 36.370
91	7	8 0 17.4	+105.743	8 4 41.6	+163.464
92	9	6 7 43.8	− 16.595	6 10 42.4	+ 49.620
93	9	6 17 45.1	− 13.278	6 22 24.8	+196.282
94	9	7 29 46.6	− 70.537	7 34 17.4	+199.483
95	9	16 58 14.7	+ 52.253	17 1 59.5	−121.233
96	10	5 49 22.6	+ 37.043	5 53 7.0	−140.836
97	10	5 59 56.3	+ 31.584	6 2 58.6	+ 74.957
98	10	7 52 1.0	− 59.046	7 55 38.3	−140.660
99	10	8 2 35.8	+ 41.485	7 59 6.6	+ 37.697
100	12	5 47 12.6	− 47.757	5 50 53.1	− 71.996
101	12	6 5 46.9	− 13.045	6 1 7.1	+180.886
102	12	7 54 47.0	− 98.820	7 59 15.0	+170.556
103	12	16 40 47.1	− 64.457	16 44 57.8	+106.771
104	12	16 52 50.1	+ 67.318	16 57 27.5	− 59.450
105	13	5 33 23.1	−108.273	5 37 24.7	+ 5.373
106	13	5 40 57.9	+ 23.976	5 44 16.3	− 32.853
107	13	5 52 48.7	+ 14.544	5 55 53.0	− 33.702
108	13	7 12 46.5	− 45.883	7 16 41.3	− 44.673
109	13	16 24 33.1	+107.687	16 29 11.0	+ 81.181
110	14	5 47 18.9	+ 50.715	5 51 36.1	−152.699
111	14	5 59 14.9	+ 15.558	6 2 46.9	− 39.519
112	14	8 9 41.9	− 15.178	8 13 42.5	+115.296
113	15	5 34 36.1	+101.361	5 38 2.3	− 48.098
114	15	5 46 38.8	+138.474	5 50 20.8	+ 89.040
115	15	7 36 47.5	+ 10.975	7 40 8.0	− 74.543
116	15	7 43 41.2	+ 51.295	7 46 58.3	+ 63.917
117	15	16 18 12.5	− 49.768	16 22 43.6	+ 9.340
118	16	5 31 58.2	− 30.625	5 34 38.2	− 17.036
119	16	5 37 53.5	+ 8.546	5 40 24.0	+ 6.579
120	16	7 56 57.9	+ 48.888	8 0 46.4	+ 22.087
121	17	5 28 53.6	− 55.743	5 32 49.6	+ 78.163
122	17	7 24 34.8	+ 92.778	7 27 56.8	− 4.440
123	17	7 50 24.2	+ 74.132	7 54 0.4	− 12.645
124	21	5 46 23.9	− 67.366	5 50 14.8	+ 22.129
125	21	5 59 34.2	+ 79.289	6 3 38.4	+ 3.924

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Revised Rectangular Coordinates (Asteroid – Star)—Continued.

No.	Date.	Washington Mean Time.	$\Delta\alpha \cos\delta$	Washington Mean Time.	$\Delta\delta$
	1900	h m s	"	h m s	"
126	Nov. 21	7 57 8.4	+ 7.135	8 0 53.4	− 51.707
127	22	5 39 1.7	+ 7.691	5 41 33.5	− 2.837
128	22	5 44 39.5	+ 4.908	5 47 51.5	− 5.748
129	22	7 13 28.6	− 46.512	7 16 56.3	− 50.538
130	22	7 55 4.0	− 71.274	7 58 39.6	− 71.906
131	27	5 45 14.8	+ 35.137	5 47 59.8	+ 4.484
132	27	5 57 14.2	+ 30.597	5 59 56.3	− 3.618
133	27	7 40 6.1	− 11.473	7 44 0.2	− 73.086
134	27	7 48 15.1	+ 19.906	7 52 6.1	+ 68.297
135	27	15 53 53.2	+ 59.558	.. ..	.....
136	30	5 31 38.8	− 19.135	5 35 0.1	+ 73.643
137	30	5 39 6.2	+112.959	5 42 41.2	+ 42.353
138	30	7 53 40.3	− 59.403	7 57 55.0	− 34.263
139	30	8 4 39.9	+ 71.253	8 1 18.9	− 62.716
140	30	14 57 12.8	− 56.752	15 1 35.9	−176.796
141	30	15 14 39.8	− 59.835	15 10 19.7	−184.793
142	Dec. 1	5 26 52.1	+132.350	5 30 9.7	+ 98.541
143	1	5 37 46.7	+129.746	5 34 27.3	+ 95.217
144	1	6 56 49.9	+110.764	7 0 33.5	+ 29.037
145	1	7 13 9.0	+106.983	7 9 27.8	+ 21.966
146	1	14 58 20.2	+ 69.491	15 3 19.7	− 31.792
147	1	15 11 21.6	− 93.025	15 7 14.8	+ 85.642
148	2	5 19 58.0	− 13.153	5 22 58.5	− 59.820
149	2	5 33 19.5	+ 11.710	5 36 36.2	+ 63.429
150	2	5 43 37.0	− 17.553	5 40 6.9	− 73.098
151	2	15 17 8.6	−169.733	15 12 59.9	− 13.117
152	8	6 32 46.4	− 4.556	6 36 0.1	− 86.009
153	8	6 44 11.8	+ 60.402	6 40 37.4	+104.683
154	8	7 22 11.3	+ 62.919	7 25 28.8	+ 63.197
155	8	14 19 56.2	− 96.774	14 16 41.8	− 47.402
156	10	5 39 31.4	− 37.661	5 36 13.2	− 73.637
157	10	5 43 17.6	− 37.599	5 46 42.1	− 83.123
158	10	5 53 37.2	− 30.804	5 50 2.8	+112.213
159	10	6 59 39.5	− 20.068	6 56 26.6	+ 49.472
160	10	14 4 49.0	− 71.584	14 1 0.8	− 43.359
161	10	14 9 26.9	− 70.499	14 13 31.0	− 56.783
162	11	5 21 27.6	+ 2.477	5 18 20.6	+ 26.023
163	11	5 24 47.8	+ 3.074	5 28 5.8	+ 16.691
164	11	5 36 27.8	+ 5.882	5 33 38.1	+ 11.399
165	11	7 13 54.8	+ 26.842	7 17 34.3	− 88.182
166	11	14 48 48.8	−109.831	14 45 6.8	−127.434
167	11	14 53 54.9	− 25.195	14 56 25.2	+ 21.908
168	12	5 11 26.5	−110.734	5 8 1.7	− 37.613
169	12	5 16 32.8	−108.601	5 19 49.6	− 48.641
170	12	7 6 41.1	− 86.018	7 3 46.4	+ 21.205
171	12	7 11 47.3	− 84.616	7 14 55.4	+ 10.087
172	13	5 28 49.0	+ 98.932	5 25 33.6	+ 31.552
173	13	5 33 41.9	− 54.519	5 37 0.9	− 40.545
174	13	5 45 14.0	+103.760	5 41 59.8	+ 15.377
175	13	7 25 34.2	− 19.329	7 22 44.2	− 22.880
176	13	7 28 28.9	+ 12.738	7 31 15.9	+ 21.216
177	13	13 46 27.5	− 0.968	13 43 0.9	+ 5.619
178	13	13 52 0.8	− 2.926	13 56 24.3	+ 93.495
179	13	14 6 26.4	+ 8.765	14 3 14.6	− 16.745
180	14	5 17 2.2	+180.266	5 11 42.7	+159.097
181	14	5 25 19.1	− 60.422	5 29 7.1	− 75.557
182	14	7 11 2.5	− 23.113	7 5 47.7	−170.457
183	14	7 14 48.2	− 58.011	7 18 26.6	+103.796
184	14	13 50 43.3	− 1.872*	13 47 16.3	−120.000*
185	14	13 56 53.7	+ 1.472*	14 1 0.5	−135.317*
186	15	5 4 20.9	−124.558	5 1 3.9	+ 9.835
187	15	5 14 43.1	−119.849	5 17 47.8	− 6.786
188	15	7 21 9.4	− 69.324	7 17 29.8	−126.443
189	15	7 25 23.0	+ 71.827	7 28 47.4	− 72.503
190	16	5 18 40.6	+267.330	5 12 57.1	+ 2.834

* Signs of $\Delta\alpha$ and $\Delta\delta$ changed from those originally published.

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Revised Rectangular Coordinates (Asteroid − Star)—Continued.

No.	Date.	Washington Mean Time.	$\Delta\alpha \cos\delta$	Washington Mean Time.	$\Delta\delta$
	1900	h m s	"	h m s	"
191	Dec. 16	5 24 5.8	+ 38.905	5 27 24.3	− 67.198
192	16	7 25 5.4	+ 56.836	7 21 17.9	− 5.159
193	16	7 35 9.5	−139.523	7 39 18.9	− 10.805
194	16	14 29 48.2	− 7.428*	14 27 36.8	− 7.209*
195	18	5 37 49.5	+162.836	5 33 5.3	+ 29.071
196	18	5 44 37.6	− 37.946	5 48 19.9	− 28.850
197	18	5 54 59.4	+ 4.055	5 52 17.1	+ 66.316
198	18	7 53 27.1	+ 67.811	7 56 48.8	− 62.830
199	19	5 17 43.5	− 13.146	5 13 12.0	+ 67.738
200	19	5 25 34.5	− 8.620	5 28 46.1	+ 51.978
201	19	7 7 31.2	+ 51.287	7 4 1.8	− 46.183
202	19	7 13 28.6	+ 54.559	7 16 31.5	− 59.282
203	20	5 31.21.1	− 58.819	5 25 23.1	−218.051
204	20	5 39 35.1	+127.486	5 44 46.1	+ 93.686
205	20	6 36 58.2	+163.623	6 32 59.5	+ 43.977
206	21	5 34 41.8	−170.911	5 30 24.1	− 23.177
207	21	5 42 10.1	−139.787	5 46 34.0	+118.430
208	21	7 18 17.8	− 74.397	7 14 37.5	+ 26.994
209	21	13 41 50.4	+134.656	13 50 11.8	+ 39.996
210	24	5 14 58.6	− 0.685	5 13 2.1	+ 1.423
211	24	5 19 12.9	+ 2.246	5 21 35.6	− 7.525
212	29	5 35 2.8	+153.660	5 30 23.5	+ 53.657
213	29	5 40 58.3	− 76.642	5 45 0.2	+156.787
214	29	7 9 28.9	+ 14.163	7 5 16.4	+ 71.611
215	29	7 14 3.6	− 78.467	7 17 53.6	− 47.616
216	29	13 38 33.3	− 27.939	13 33 49.4	+321.940
	1901				
217	Jan. 2	7 11 7.5	− 30.128	7 7 2.3	−106.102
218	3	5 35 1.7	− 64.879	5 26 46.7	−277.569
219	3	5 41 49.5	− 51.150	5 46 49.4	−128.165
220	3	5 54 26.6	− 23.382	5 51 20.0	+ 91.902
221	3	7 15 37.4	+ 76.388	7 20 33.1	− 2.843
222	4	5 30 26.9	− 31.814	5 27 0.1	+ 66.073
223	4	5 33 53.7	− 27.569	5 36 42.8	+ 55.754
224	4	6 29 31.3	+ 43.243	6 26 59.3	+ 2.683
225	4	6 32 56.1	+ 47.459	6 35 33.6	− 6.625
226	5	5 30 30.2	− 84.392	5 26 54.5	+ 34.221
227	5	5 35 31.7	− 77.720	5 38 40.6	+ 21.916
228	5	6 41 37.4	+ 8.418	6 38 55.1	− 42.233
229	5	6 44 25.7	+ 21.177	6 47 14.7	+ 50.207
230	5	12 45 13.3	+ 37.081	12 40 28.8	−123.771
231	5	12 50 25.9	+ 44.444	12 54 0.2	−138.611
232	8	6 21 58.8	+ 56.866	6 18 13.3	− 69.020†
233	8	6 26 39.2	+ 63.325	6 29 48.4	− 81.630
234	9	6 1 30.2	+ 71.710	5 58 13.6	− 22.687
235	9	6 5 43.5	+ 77.638	6 8 27.2	− 34.588
236	13	5 59 24.7	+108.801	5 55 21.7	− 4.687
237	13	6 4 14.4	+116.018	6 7 22.7	− 18.058
238	13	12 11 27.4	− 65.884	12 7 37.7	+ 4.511
239	13	12 16 36.6	− 57.033	12 20 22.2	− 9.760
240	15	6 23 55.3	− 86.292	6 21 8.0	− 87.285
241	15	6 28 56.3	− 77.973	6 31 26.3	− 99.003
242	16	5 55 40.4	−155.519	5 51 43.9	+ 67.340
243	16	6 46 32.9	− 71.692	6 50 46.1‡	+ 4.713
244	19	6 18 12.4	+146.455	6 14 10.2	− 90.053
245	19	6 24 11.4	+156.772	6 28 17.3	−104.857
246	20	6 17 39.3	+ 47.866	6 13 52.8	−134.104
247	20	6 22 18.2	+ 55.495	6 25 59.7	−147.091
248	22	6 42 7.3	+ 50.706	6 39 16.3	+ 55.770
249	22	6 47 31.1	+ 59.921	6 50 55.0	+ 44.129
250	29	6 53 4.0	−120.178	6 49 9.1	−174.704

* Signs of $\Delta\alpha$ and $\Delta\delta$ changed from those originally published.

† $\Delta\delta$ Changed 1", error in original reduction.

‡ Time of $\Delta\delta$ decreased $2^m\ 30^s$ from that originally published.

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[illegible]

[illegible]

[illegible]

							Parallax		
1	[illegible]	[illegible]	[illegible]	(6)	+6.236	− 2.914	−1.315	2 42 55.909	−0.00[illegible]
2	[illegible]	[illegible]	[illegible]	(3)	6.237	+ 5.322	−1.313	42 55.900	[−0.0[illegible]
3	[illegible]	[illegible]	[illegible]	(3)	6.238	+ 4.346	−1.266	42 54.972	−0.0[illegible]
4	[illegible]	[illegible]	[illegible]	(8)	6.240	− 4.653	−1.250	42 54.807	−0.0[illegible]
5	[illegible]	[illegible]	[illegible]	(9)	+6.257	− 3.787	+1.121	2 42 45.946	−0.00[illegible]
6	[illegible]	[illegible]	[illegible]	(9)	+6.257	− 4.025	+1.176	2 42 45.763	−0.10[illegible]
7	[illegible]	[illegible]	[illegible]	(9)	6.285	+ 1.632	−1.337	42 30.968	−0.077
8	[illegible]	[illegible]	[illegible]	(9)	6.286	+ 1.197	−1.338	42 30.533	−0.08[illegible]
9	[illegible]	[illegible]	[illegible]	(9)	6.287	+ 0.282	−1.300	42 29.657	−0.087
10	[illegible]	[illegible]	[illegible]	(4)	+6.306	− 1.935	+0.927	2 42 20.285	−0.00[illegible]
11	[illegible]	[illegible]	[illegible]	(4)	+6.307	− 2.297	+0.985	2 42 19.992	−0.121
12	[illegible]	[illegible]	[illegible]	(4)	6.307	− 2.727	+1.050	42 19.627	−0.140
13	[illegible]	[illegible]	[illegible]	(6)	6.337	+15.945	−1.320	42 0.075	[−0.017]
14	[illegible]	[illegible]	[illegible]		6.338	+ 8.460	−1.265	. . . .	. . .
15	[illegible]	[illegible]	[illegible]	(4)	+6.353	+ 1.608	+1.018	2 41 48.875	−0.118
16	[illegible]	[illegible]	[illegible]	(4)	+6.354	+ 1.128	+1.091	2 41 48.469	−0.083
17	[illegible]	[illegible]	[illegible]	(14)	6.525	+ 1.714	−1.456	39 21.160	−0.134
18	[illegible]	[illegible]	[illegible]	(14)	6.525	+ 1.495	−1.461	39 20.936	−0.105
19	[illegible]	[illegible]	[illegible]	(14)	6.526	+ 1.151	−1.465	39 20.589	−0.139
20	[illegible]	[illegible]	[illegible]	(14)	+6.527	− 2.355	−1.356	2 39 17.193	−0.137
21	[illegible]	[illegible]	[illegible]	(3)	+6.529	+ 0.252	−1.328	2 39 16.882	−0.076
22	[illegible]	[illegible]	[illegible]	(1)	6.545	− 1.578	+1.182	39 0.378	−0.135
23	[illegible]	[illegible]	[illegible]	(10)	6.548	+ 2.365	+1.250	38 59.767	−0.093
24	[illegible]	[illegible]	[illegible]	(10)	6.549	+ 1.485	+1.319	38 58.957	−0.136
25	[illegible]	[illegible]	[illegible]	(3)	+6.571	+11.426	−1.492	2 38 29.094	[−0.053]
26	[illegible]	[illegible]	[illegible]	(1)	+6.574	+ 7.486	−1.476	2 38 27.57	−0.17
27	[illegible]	[illegible]	[illegible]	(1)	6.575	+ 5.111	−1.365	38 25.31	−0.14
28	[illegible]	[illegible]	[illegible]	(24)	6.591	− 6.576	+1.300	38 6.183	−0.138
29	[illegible]	[illegible]	[illegible]	(24)	6.591	− 7.284	+1.352	2 38 5.527	−0.145
30	[illegible]	[illegible]	[illegible]		+6.616	+ 1.605	−1.488	. . . .	. . .

For the reduction to 1901.0 the quantities f', H, h, log i, were taken from the American Ephemeris for 1901, page 295; and the quantities G' and g' from the same Ephemeris, page 303.

The parallax of the asteroid was computed for $\pi = 8''.800$. The following numbers were used in the computations:

$$\log \frac{1}{15} \pi\rho \cos \varphi' = 9.659963$$
$$\log \tan \varphi' = 9.904188$$
$$\log \pi\rho \sin \varphi' = 0.740242$$

These were arrived at by the use of CLARK'S spheroid of 1866, as best representing this region. No allowance was made for the elevation of the observatory which is about 300 feet above sea level.

The observed positions of Eros were compared with the ephemeris given in Circular No. 9, of the Paris Astrographic Conference of July, 1900. The differences are printed in the column (O—C), where a number of outstanding cases have been bracketed.

Observations in Declination.

No.	Date.	Washington Mean Time.	Comparison Star δ 1900.0	Weight.	Ap. Pl. Red.	$\Delta\delta$	Parallax.	Geocentric δ.	O-C
	1900	h m s	° ′ ″		″	″	″	° ′ ″	″
1	Oct. 9	7 34 29.8	+47 51 50.96	(6)	+13.70	+ 40.95	+6.93	+47 52 52.54	+1.52
2	9	7 44 39.6	+47 52 57.94	(3)	13.71	− 17.50*	+6.50	53 0.65	+0.75
3	9	8 37 26.2	57.94	(3)	13.72	+ 31.03	+4.27	53 46.96	+0.95
4	9	8 47 15.1	+47 53 40.02	(8)	13.69	− 1.83	+3.87	+47 53 55.75	+1.17
5	9	17 33 1.8	+48 0 29.55	(9)	+13.78	+ 48.60	+2.36	+48 1 34.29	+1.51
6	9	.. ..	29.55	(9)	.....	.....	....	.. ..	....
7	10	7 16 56.9	+48 13 8.62	(9)	+13.91	− 2.32	+7.54	+48 13 27.75	+1.18
8	10	7 40 6.9	8.62	(9)	13.92	+ 18.68	+6.53	13 47.74	+1.19
9	10	8 25 52.6	8.62	(9)	13.92	+ 60.11	+4.56	13 27.21	+1.18
10	10	16 24 53.2†	+48 21 47.72	(4)	+13.99	− 42.50	+0.08	+48 21 19.29	+1.01
11	10	16 38 8.1	47.72	(4)	+13.99	− 31.13	+0.50	+48 21 31.08	+1.42
12	10	16 53 1.5	47.72	(4)	14.00	− 18.93	+1.01	21 43.80	+1.36
13	11	8 28 18.1	+48 33 49.50	(6)	14.18	+ 54.57	+4.26	35 2.51	+0.87
14	11	8 53 42.9	+48 34 [46.1]	..	14.17	+ 21.16	+3.20	.. ..	....
15	11	16 35 50.8	+48 40 31.55	(4)	+14.24	+ 70.51	+0.50	+48 41 56.80	+1.56
16	11	16 54 7.3	31.55	(4)	+14.24	+ 85.54	+1.14	+48 42 12.47	+1.77
17	15	6 40 36.0	+49 51 57.83	(14)	15.19	+ 14.65	+8.39	+49 52 36.06	+1.84
18	15	6 48 58.0	57.83	(14)	15.19	+ 21.69	+7.99	52 42.70	+1.85
19	15	6 56 41.0	57.83	(14)	15.20	+ 27.90	+7.63	52 48.56	+1.60
20	15	8 37 19.8	57.83	(14)	+15.21	+112.30	+2.98	+49 54 8.32	+1.65
21	15	8 47 1.6	+49 53 22.65	(3)	+15.22	+ 35.19	+2.56	+49 54 15.62	+1.28
22	15	16 39 16.1	+49 59 3.15	(1)	15.32	+ 68.60	+1.01	+50 0 28.08	+1.42
23	15	16 57 48.1	+50 2 22.47	(10)	15.33	−117.19	+1.75	0 42.36	+1.14
24	15	17 18 12.6	22.47	(10)	15.34	−101.60	+2.60	0 58.81	+1.57
25	16	6 59 16.8	+50 11 1.54	(3)	+15.53	+ 14.92	+7.31	+50 11 39.30	+1.63
26	16	7 36 39.6	+50 12 32.6	(1)	+15.52	− 45.74	+5.52	+50 12 7.9	+1.3
27	16	8 39 4.0	32.6	(1)	15.53	+ 4.72	+2.66	12 55.5	+0.6
28	16	17 0 31.1	+50 18 13.28	(24)	15.62	+ 51.88	+2.01	19 22.79	+1.58
29	16	17 17 10.9	13.28	(24)	15.63	+ 63.94	+2.73	+50 19 35.58	+1.59
30	17	6 10 56.9	+50 29 [25.3]	..	+15.81	− 25.87	+9.47	.. ..	....

* Sign of $\Delta\delta$ changed from that originally published. † Time of $\Delta\delta$ increased 5^m from that originally published.

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Observations in Right Ascension—Continued.

No.	Date.	Washington Mean Time.	Comparison Star α 1900.0	Weight.	Ap. Pl. Red.	$\Delta\alpha$	Parallax.	Geocentric α.	O–C
	1900	h m s	h m s		s	s	s	h m s	s
31	Oct. 17	6 15 17.4	2 37 [27.63]	..	+6.614	+ 1.812	−1.497	. .. .	.
32	17	6 22 36.1	2 37 [28.03]	..	6.616	+ 1.141	−1.505	. .. .	
33	17	16 23 39.4	2 37 16.416	(16)	6.636	−14.752	+1.222	2 37 9.522	−0.161
34	17	17 6 37.1	2 36 [57.00]	..	6.637	+ 2.734	+1.373	. .. .	..
35	18	6 17 53.9	2 36 17.805	(16)	+6.656	+11.043	−1.531	2 36 33.973	−0.182
36	18	6 30 5.9	2 36 31.260	(2)	+6.662	− 2.984	−1.540	2 36 33.398	−0.124
37	18	8 6 52.7	31.260	(2)	6.663	− 7.284	−1.454	36 29.185	−0.103
38	18	16 15 19.8	2 35 55.952	(4)	6.676	+ 3.667	+1.230	36 7.525	−0.076
39	18	16 30 24.0	55.952	(4)	6.677	+ 2.881	+1.290	36 6.800	−0.123
40	18	17 3 59.0	55.952	(4)	+6.677	+ 1.188	+1.404	2 36 5.221	−0.191
41	18	17 17 13.8	55.952	(4)	+6.677	+ 0.642	+1.441	2 36 4.712	−0.103
42	19	6 22 0.8	2 35 [30.66]	..	6.703	− 7.019	−1.565	. .. .	...
43	19	7 33 17.1	[30.66]	..	6.705	−10.421	−1.536	. .. .	....
44	19	7 55 44.1	[30.66]	..	6.705	−11.485	−1.496	. .. .	....
45	19	16 15 57.6	2 34 52.800	(18)	+6.720	− 0.335	+1.275	2 35 0.460	−0.121
46	19	17 4 44.4	52.800	(18)	+6.721	− 2.895	+1.446	2 34 58.072	−0.161
47	19	17 21 52.9	52.800	(18)	6.721	− 3.763	+1.491	34 57.249	−0.157
48	20	6 2 9.3	2 34 7.441	(8)	6.744	+ 7.316	−1.579	34 19.922	−0.173
49	20	8 1 28.6	7.441	(8)	6.746	+ 1.256	−1.496	34 13.947	−0.178
50	20	8 11 47.1	7.441	(8)	+6.746	+ 0.711	−1.469	2 34 13.429	−0.179
51	20	8 29 7.9	7.441	(8)	+6.746	− 0.189	−1.417	2 34 12.581	−0.156
52	20	16 23 43.0	2 33 36.728	(4)	6.760	+ 3.700	+1.348	33 48.536	−0.122
53	20	17 6 59.4	36.728	(4)	6.760	+ 1.211	+1.491	33 46.190	[−0.248]
54	21	6 38 35.3	2 32 58.213	(11)	6.781	+ 0.504	−1.626	33 3.872	−0.187
55	21	6 52 16.7	58.213	(11)	+6.781	− 0.168	−1.621	2 33 3.205	−0.127
56	21	8 7 3.7	58.213	(11)	+6.783	− 4.310	−1.493	2 32 59.193	−0.160
57	22	6 18 49.9	2 31 35.521	(4)	6.817	+ 5.675	−1.652	31 46.361	−0.142
58	22	7 19 49.9	35.521	(4)	6.818	+ 2.170	−1.612	31 42.897	−0.180
59	24	6 29 43.6	2 28 51.621	(2)	6.888	− 1.352	−1.706	28 55.451	−0.192
60	24	6 37 36.8	2 28 54.428	(13)	+6.886	− 4.699	−1.702	2 28 54.913	−0.241
61	24	8 32 48.0	2 28 51.621	(2)	+6.889	− 9.340	−1.418	2 28 47.752	−0.240
62	24	16 37 42.0	2 28 [12.13]	..	6.902	− 3.258	+1.567	. .. .	.. .
63	24	17 19 5.3	[12.13]	..	6.903	− 5.950	+1.670	. .. .	....
64	26	8 39 2.7	2 25 32.111	(13)	6.948	+ 2.254	−1.384	25 39.929	−0.215
65	27	6 28 22.7	2 23 57.325	(3)	+6.968	+ 7.162	−1.775	2 24 9.680	−0.154
66	27	6 35 17.6	2 24 8.73	(1)	+6.970	− 4.868	−1.768	2 24 9.06	−0.29
67	27	7 59 16.7	2 23 57.325	(3)	6.970	+ 0.534	−1.554	24 3.275	−0.177
68	29	6 25 5.3	2 20 39.714	(10)	7.012	− 3.921	−1.818	20 40.987	−0.208
69	29	7 13 34.9	39.714	(10)	7.013	− 7.713	−1.717	2 20 37.297	−0.268
70	29	7 32 30.1	2 20 [23.08]	..	+7.013	+ 7.460	−1.657	. .. .	....
71	29	16 14 19.7	2 19 41.747	(13)	+7.020	+ 6.138	+1.701	2 19 56.606	−0.244
72	29	17 1 23.4	41.747	(13)	7.020	+ 2.440	+1.815	19 53.022	−0.263
73	29	17 16 48.4	41.747	(13)	7.020	+ 1.280	+1.836	19 51.883	−0.234
74	30	7 21 14.3	2 18 34.133	(13)	7.035	+ 7.898	−1.699	18 47.367	−0.246
75	30	7 30 40.5	2 18 43.364	(2)	+7.030	− 2.094	−1.666	2 18 46.634	−0.252
76	30	8 10 47.6	2 18 34.133	(13)	+7.035	+ 3.855	−1.493	2 18 43.530	−0.265
77	Nov. 4	6 33 12.7	2 9 14.358	(9)	7.064	−12.186	−1.866	9 7.370	−0.359
78	4	7 24 53.2	14.358	(9)	7.065	−16.676	−1.668	9 3.079	−0.294
79	4	7 55 12.9	14.358	(9)	7.065	−19.434	−1.512	9 0.477	−0.339
80	5	5 44 24.7	2 7 26.613	(11)	+7.058	−22.104	−1.979	2 7 9.588	−0.319
81	5	6 1 2.5	2 7 4.093	(11)	+7.054	− 0.940	−1.951	2 7 8.256	−0.237
82	5	7 48 14.7	4.093	(11)	7.055	−10.496	−1.533	6 59.119	−0.252
83	5	16 24 54.0	2 6 8.717	(4)	7.052	− 2.673	+1.981	6 15.077	−0.261
84	5	16 34 58.3	2 6 10.502	(6)	7.055	− 5.388	+1.994	6 14.163	−0.316
85	5	17 12 20.0	2 5 54.312	(7)	+7.046	+ 7.652	+2.012	2 6 11.022	−0.268

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Observations in Declination—Continued.

No.	Date.	Washington Mean Time.	Comparison Star ∂ 1900.0	Weight.	Ap. Pl. Red.	Δ∂	Parallax.	Geocentric ∂.	O–C
	1900	h m s	° ′ ″		″	″	″	° ′ ″	″
31	Oct. 17	6 18 34.4	+50 28 [19.0]	..	+15.82	+ 46.72	+9.09	.. ..	....
32	17	6 25 45.7	+50 29 [25.3]	..	15.81	− 13.77	+8.74	.. ..	....
33	17	16 29 21.1	+50 37 13.01	(16)	15.92	− 19.83	+0.87	+50 37 9.97	+1.28
34	17	17 10 29.4	+50 38 [17.0]	..	15.97	− 54.72	+2.61	.. ..	....
35	18	6 23 2.9	+50 45 14.13	(16)	+16.17	+109.56	+8.69	+50 47 28.55	+1.10
36	18	6 34 34.8	+50 48 30.25	(2)	+16.13	− 77.74	+8.12	+50 47 36.76	+0.84
37	18	8 10 52.1	30.25	(2)	16.15	− 1.62	+3.42	48 48.20	+1.47
38	18	16 19 33.3	+50 54 11.34	(4)	16.30	+ 17.49	+0.61	54 45.74	+1.76
39	18	16 34 24.3	11.34	(4)	16.30	+ 27.14	+1.22	54 56.00	+1.22
40	18	17 7 43.6	11.34	(4)	+16.30	+ 50.00	+2.68	+50 55 20.32	+1.32
41	18	17 20 54.3	11.34	(4)	+16.31	+ 58.92	+3.28	+50 55 29.85	+1.27
42	19	6 26 22.7	+51 4 [58.9]	..	16.47	− 29.60	+8.33	.. ..	....
43	19	7 37 23.6	[58.9]	..	16.48	+ 25.11	+4.77	.. ..	....
44	19	7 59 51.1	[58.9]	..	16.48	+ 42.69	+3.68	.. ..	....
45	19	16 19 47.6	+51 12 12.86	(18)	+16.64	− 33.50	+0.76	+51 11 56.76	+0.82
46	19	17 7 46.9	12.86	(18)	+16.65	− 1.37	+2.88	+51 12 31.02	+1.26
47	19	17 25 15.9	12.86	(18)	16.65	+ 9.82	+3.70	12 43.03	+0.95
48	20	5 58 16.9	+51 22 38.88	(8)	16.86	− 96.11	+9.54	21 29.17	+1.25
49	20	8 4 17.9	38.88	(8)	16.88	− 2.26	+3.20	22 56.70	+1.67
50	20	8 15 1.3	38.88	(8)	+16.88	+ 5.71	+2.70	+51 23 4.17	+1.75
51	20	8 31 49.3	38.88	(8)	+16.89	+ 18.17	+1.92	+51 23 15.86	+1.84
52	20	16 30 2.3	+51 28 48.19	(4)	17.03	− 23.01	+1.35	28 43.56	+1.58
53	20	17 11 10.8	48.19	(4)	17.03	+ 3.02	+3.25	29 11.49	+1.47
54	21	6 41 41.5	+51 37 33.42	(11)	17.23	+ 20.11	+7.10	38 17.86	+1.34
55	21	6 55 17.0	33.42	(11)	+17.23	+ 30.13	+6.58	+51 38 27.36	+1.78
56	21	8 10 36.7	33.42	(11)	+17.25	+ 84.17	+2.63	+51 39 17.47	+1.68
57	22	6 22 9.4	+51 52 23.09	(4)	17.64	+ 59.54	+7.89	53 48.16	+1.45
58	22	7 23 35.4	23.09	(4)	17.65	+102.79	+4.67	+51 54 28.20	+2.07
59	24	6 33 15.3	+52 23 35.91	(2)	18.45	− 35.64	+6.79	+52 23 25.51	+0.91
60	24	6 40 47.6	+52 22 16.70	(13)	+18.44	+ 48.98	+6.38	+52 23 30.50	+1.48
61	24	8 36 44.0	+52 23 35.91	(2)	+18.47	+ 43.81	+0.55	+52 24 38.74	+1.84
62	24	16 42 43.0	+52 29 [58.4]	..	18.64	− 59.82	+2.79	.. ..	....
63	24	17 25 21.0	[58.4]	..	18.64	− 38.00	+5.00	.. ..	....
64	26	8 42 15.5	+52 51 49.95	(13)	19.38	− 51.53	−0.30	+52 51 17.50	+0.87
65	27	6 31 33.7	+53 0 46.23	(3)	+19.82	+ 72.46	+6.05	+53 2 24.56	+1.42
66	27	6 38 16.7	+53 1 24.3	(1)	+19.79	+ 36.50	+5.67	+53 2 26.3	[−0.2]
67	27	8 3 14.9	+53 0 46.23	(3)	19.84	+123.02	+1.19	3 10.28	+1.91
68	29	6 28 28.7	+53 23 34.56	(10)	20.74	+ 29.93	+5.62	24 30.85	+1.66
69	29	7 16 57.3	34.56	(10)	20.74	+ 52.97	+2.93	+53 24 51.20	+1.35
70	29	7 36 37.2	+53 24 [58.4]	..	+20.79	− 21.61	+1.89	.. ..	....
71	29	16 18 27.0	+53 28 41.11	(13)	+20.97	− 27.46	+2.88	+53 28 37.50	+0.78
72	29	17 4 42.7	41.11	(13)	20.98	− 10.84	+5.46	28 56.71	+0.94
73	29	17 19 42.4	41.11	(13)	20.98	− 5.48	+6.32	29 2.93	+1.00
74	30	7 26 1.4	+53 37 27.64	(13)	21.27	−189.63	+2.12	34 41.40	+0.67
75	30	7 33 51.5	+53 34 5.24	(2)	+21.26	+ 16.81	+1.71	+53 34 45.02	+1.24
76	30	8 15 20.1	+53 37 27.64	(13)	+21.28	−167.90	−0.33	+53 35 0.69	+0.77
77	Nov. 4	6 36 50.2	+54 10 3.18	(9)	23.76	− 30.48	+3.19	+54 9 59.65	+0.89
78	4	7 29 48.9	3.18	(9)	23.77	− 17.04	+0.29	10 10.20	+0.93
79	4	8 0 8.2	3.18	(9)	23.77	− 9.80	−1.20	10 15.95	+0.70
80	5	5 49 22.3	+54 11 22.94	(11)	+24.24	+137.81	+5.69	+54 14 10.68	[+1.97]
81	5	5 55 29.3	+54 11 23.28	(11)	+24.29	+138.81	+5.32	+54 14 11.70	[+2.01]
82	5	7 52 36.0	23.28	(11)	24.31	+163.00	−1.16	14 29.43	+1.24
83	5	16 28 35.5	+54 14 0.00	(4)	24.52	+ 75.56	+5.95	15 46.03	+1.01
84	5	16 31 44.5	+54 15 45.06	(6)	24.52	− 29.62	+6.15	15 46.11	+0.65
85	5	17 16 17.0	+54 13 7.44	(7)	+24.60	+131.48	+8.92	+54 15 52.44	+0.71

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Observations in Right Ascension—Continued.

No.	Date.	Washington Mean Time.	Comparison Star α 1900.0	Weight.	Ap. Pl. Red.	$\Delta\alpha$	Parallax.	Geocentric α.	O-C
	1900	h m s	h m s		s	s	s	h m s	s
86	Nov. 6	5 52 8.6	2 5 5.804	(6)	+7.050	− 4.866	−1.976	2 5 6.012	−0 [illegible]
87	6	7 33 24.6	5.804	(6)	7.051	−13.942	−1.598	4 57.315	−0 [illegible]
88	6	16 24 3.4	2 4 [6.96]	..	7.046	− 4.140	+2.008	. .. .	
89	6	17 3 39.2	[6.96]	..	7.046	− 7.596	+2.032	. .. .	
90	7	5 39 34.6	2 3 15.312	(13)	+7.044	−16.855	−2.007	2 3 3.494	−0 [illegible]
91	7	8 0 17.4	2 2 33.784	(12)	+7.032	+12.084	−1.417	2 2 51.483	−0 [illegible]
92	9	6 7 43.8	1 58 [50.53]	..	7.007	− 1.898	−1.942	. .. .	
93	9	6 17 45.1	1 58 49.286	(9)	7.002	− 1.518	−1.908	1 58 52.862	−0 [illegible]
94	9	7 29 46.6	49.286	(9)	7.002	− 8.064	−1.558	58 46.666	−0 [illegible]
95	9	16 58 14.7	1 57 42.969	(10)	+7.001	+ 5.980	+2.081	1 57 57.802	−0 [illegible]
96	10	5 49 22.6	1 56 42.916	(6)	+6.991	+ 4.239	−1.995	1 56 52.151	−0 [illegible]
97	10	5 59 56.3	1 56 [42.65]	..	6.985	+ 3.611	−1.963	. .. .	
98	10	7 52 1.0	1 56 42.916	(6)	6.991	− 6.756	−1.388	56 41.763	−0 [illegible]
99	10	8 2 35.8	1 56 30.478	(2)	6.984	+ 4.744	−1.313	56 40.893	−0 [illegible]
100	12	5 47 12.6	1 52 49.942	(3)	+6.939	− 5.453	−1.993	1 52 49.435	−0 [illegible]
101	12	6 5 46.9	1 52 44.437	(14)	+6.932	− 1.488	−1.927	1 52 47.954	−0 [illegible]
102	12	7 54 47.0	44.437	(14)	6.931	−11.274	−1.301	52 38.793	−0 [illegible]
103	12	16 40 47.1	1 51 53.625	(6)	6.921	− 7.350	+2.124	51 55.320	[−0 [illegible]
104	12	16 52 50.1	1 51 [37.51]	..	6.922	+ 7.681	+2.112	. .. .	
105	13	5 33 23.1	1 50 59.037	(3)	+6.910	−12.341	−2.029	1 50 51.577	−0 [illegible]
106	13	5 40 57.9	1 50 43.359	(3)	+6.908	+ 2.733	−2.006	1 50 50.994	−0 [illegible]
107	13	5 52 48.7	43.359	(3)	6.908	+ 1.658	−1.965	50 49.960	−0 [illegible]
108	13	7 12 46.5	43.359	(3)	6.908	− 5.230	−1.559	50 43.478	−0 [illegible]
109	13	16 24 33.1	1 49 37.280	(20)	6.888	+12.260	+2.141	49 58.569	−0 [illegible]
110	14	5 47 18.9	1 48 43.040	(6)	+6.878	+ 5.772	−1.974	1 48 53.716	−0 [illegible]
111	14	5 59 14.9	1 48 46.13	(1)	+6.876	+ 1.770	−1.927	1 48 52.85	−0 [illegible]
112	14	8 9 41.9	1 48 [38.32]	..	6.870	− 1.726	−1.109	. .. .	
113	15	5 34 36.1	1 46 44.367	(4)	6.840	+11.505	−2.008	47 0.704	−0 [illegible]
114	15	5 46 38.8	1 46 39.187	(7)	6.835	+15.711	−1.964	46 59.769	−0 [illegible]
115	15	7 36 47.5	1 46 44.367	(4)	+6.839	+ 1.246	−1.325	1 46 51.127	−0 [illegible]
116	15	7 43 41.2	1 46 39.187	(7)	+6.835	+ 5.819	−1.273	1 46 50.568	−0. [illegible]
117	15	16 18 12.5	1 46 7.18	(1)	6.825	− 5.641	+2.159	46 10.52	[−0. [illegible]
118	16	5 31 58.2	1 45 8.522	(11)	6.806	− 3.466	−2.006	45 9.856	−0. [illegible]
119	16	5 37 53.5	1 45 3.570	(3)	6.804	+ 0.967	−1.984	45 9.357	−0. [illegible]
120	16	7 56 57.9	1 44 47.612	(6)	+6.799	+ 5.531	−1.129	1 44 58.813	−0. [illegible]
121	17	5 28 53.6	1 43 23.99	(1)	+6.765	− 6.287	−2.003	1 43 22.47	−0 [illegible]
122	17	7 24 34.8	1 42 58.112	(3)	6.760	+10.465	−1.341	43 13.996	−0 [illegible]
123	17	7 50 24.2	58.112	(3)	6.760	+ 8.362	−1.139	43 12.095	−0 [illegible]
*124	21	5 46 23.9	1 36 55.834	(9)	6.599	− 7.477	−1.843	36 53.113	−0. [illegible]
125	21	5 59 34.2	1 36 38.708	(7)	+6.596	+ 8.801	−1.771	1 36 52.334	−0. [illegible]
126	21	7 57 8.4	38.708	(7)	+6.595	+ 0.792	−0.904	1 36 45.191	−0. [illegible]
127	22	5 39 1.7	1 35 23.215	(22)	6.554	+ 0.850	−1.855	35 28.764	−0. [illegible]
128	22	5 44 39.5	23.215	(22)	6.554	+ 0.542	−1.826	35 28.485	−0. [illegible]
129	22	7 13 28.6	23.215	(22)	6.554	− 5.137	−1.227	35 23.405	−0. [illegible]
130	22	7 55 4.0	23.215	(22)	+6.553	− 7.872	−0.876	1 35 21.020	−0. [illegible]
131	27	5 45 14.8	1 29 43.469	(3)	+6.333	+ 3.773	−1.672	1 29 51.903	−0. [illegible]
132	27	5 57 14.2	43.469	(3)	6.333	+ 3.285	−1.596	29 51.491	−0. [illegible]
133	27	7 40 6.1	43.469	(3)	6.332	− 1.232	−0.783	29 47.786	−0. [illegible]
134	27	7 48 15.1	1 29 39.819	(1½)	6.328	+ 2.136	−0.710	29 47.573	−0. [illegible]
135	27	15 53 53.2	1 29 15.821	(5)	+6.314	+ 6.379	+2.134	1 29 30.648	−0. [illegible]
136	30	5 31 38.8	1 27 44.17	(1)	+6.208	− 2.015	−1.660	1 27 46.70	−0. [illegible]
137	30	5 39 6.2	1 27 30.022	(11)	6.205	+11.894	−1.613	27 46.508	−0. [illegible]
138	30	7 53 40.3	1 27 44.17	(1)	6.206	− 6.252	−0.529	27 43.60	−0. [illegible]
139	30	8 4 39.9	1 27 30.022	(11)	6.203	+ 7.500	−0.427	27 43.298	−0. [illegible]
140	30	14 57 12.8	1 27 32.188	(8)	+6.196	− 5.963	+2.173	1 27 34.594	−0. [illegible]

*Ephemeris changed from A to B.

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Observations in Declination—Continued.

No.	Date.	Washington Mean Time.	Comparison Star δ 1900.0	Weight.	Ap. Pl. Red.	Δδ	Parallax.	Geocentric δ.	O–C
	1900	h m s	° ′ ″		″	″	″	° ′ ″	″
86	Nov. 6	5 55 3.4	+54 16 36.37	(6)	+24.80	+ 24.74	+5.01	+54 17 30.92	[+0.18]
87	6	7 37 8.4	36.37	(6)	24.82	+ 42.80	−0.73	17 43.26	[+1.58]
88	6	16 27 31.4	+54 17 [41.1]	..	25.04	+ 27.26	+6.30	.. ..	....
89	6	17 7 5.9	[41.1]	..	25.04	+ 28.74	+8.80	.. ..	....
90	7	5 43 45.9	+54 19 55.35	(13)	+25.28	− 36.37	+5.38	+54 19 49.64	+0.57
91	7	8 4 41.6	+54 16 53.79	(12)	+25.41	+163.46	−2.30	+54 20 0.36	+0.77
92	9	6 10 42.4	+54 20 [8.9]	..	26.36	+ 49.62	+3.05	.. ..	....
93	9	6 22 24.8	+54 17 43.18	(9)	26.38	+196.28	+2.36	21 28.20	+1.16
94	9	7 34 17.4	43.18	(9)	26.39	+199.48	−1.50	21 27.55	+1.29
95	9	17 1 59.5	+54 22 39.71	(10)	+26.62	−121.23	+9.85	+54 21 14.95	+0.25
96	10	5 53 7.0	+54 22 33.92	(6)	+26.88	−140.84	+3.79	+54 20 43.75	+0.20
97	10	6 2 58.6	+54 18 [58.7]	..	26.88	+ 74.96	+3.19	.. ..	....
98	10	7 55 38.3	+54 22 33.92	(6)	26.90	−140.66	−2.75	20 37.41	+0.45
99	10	7 59 6.6	+54 19 35.78	(2)	26.93	+ 37.70	−2.89	20 37.52	+0.75
100	12	5 50 53.1	+54 16 50.65	(3)	+27.86	− 72.00	+3.27	+54 16 9.78	+0.34
101	12	6 1 7.1	+54 12 37.51	(14)	+27.87	+180.89	+ 2.64	+54 16 8.91	+0.89
102	12	7 59 15.0	37.51	(14)	27.89	+170.56	− 3.40	15 52.56	+1.14
103	12	16 44 57.8	+54 12 7.96	(6)	28.08	+106.77	+10.15	14 32.96	+0.53
104	12	16 57 27.5	+54 14 [51.4]	..	28.12	− 59.45	+10.97	.. ..	....
105	13	5 37 24.7	+54 11 44.60	(3)	+28.31	+ 5.37	+ 3.78	+54 12 22.06	+0.76
106	13	5 44 16.3	+54 12 21.23	(3)	+28.35	− 32.85	+ 3.36	+54 12 20.09	+0.03
107	13	5 55 53.0	21.23	(3)	28.35	− 33.70	+ 2.64	12 18.52	+0.57
108	13	7 16 41.3	21.23	(3)	28.37	− 44.67	− 1.80	12 3.17	+0.02
109	*3	16 29 11.0	+54 8 17.89	(20)	28.60	+ 81.18	+ 9.58	10 17.25	+0.53
110	14	5 51 36.1	+54 9 27.06	(6)	+28.83	−152.70	+ 2.59	+54 7 25.78	−0.13
111	14	6 2 46.9	+54 7 33.0	(1)	+28.82	− 39.52	+ 1.91	+54 7 24.2	+0.8
112	14	8 13 42.5	+54 4 [34.3]	..	28.86	+115.30	− 4.36	.. ..	....
113	15	5 38 2.3	+54 1 50.96	(4)	29.31	− 48.10	+ 3.12	1 35.29	+0.18
114	15	5 50 20.8	+53 59 31.40	(7)	29.32	+ 89.04	+ 2.36	1 32.12	+0.30
115	15	7 40 8.0	+54 1 50.96	(4)	+29.33	− 74.54	− 3.32	+54 1 2.43	+0.14
116	15	7 46 58.3	+53 59 31.40	(7)	+29.33	+ 63.92	− 3.60	+54 1 1.05	+0.62
117	15	16 22 43.6	+53 57 48.3	(1)	29.48	+ 9.34	+10.11	+53 58 37.2	+0.4
118	16	5 34 38.2	+53 54 25.68	(11)	29.73	− 17.04	+ 3.02	54 41.39	+0.11
119	16	5 40 24.0	+53 54 0.76	(3)	29.73	+ 6.58	+ 2.67	54 39.74	+0.24
120	16	8 0 46.4	+53 53 8.68	(6)	29.79	+ 22.09	− 4.30	+53 53 56.26	+0.44
121	17	5 32 49.6	+53 44 55.7	(1)	+30.15	+ 78.16	+ 2.84	+53 46 46.8	−0.2
122	17	7 27 56.8	+53 45 44.27	(3)	30.22	− 4.44	− 3.25	46 6.80	+0.36
123	17	7 54 0.4	44.27	(3)	30.22	− 12.64	− 4.24	45 57.61	+0.40
*124	21	5 50 14.8	+53 4 24.20	(9)	31.71	+ 22.13	+ 0.72	5 18.76	+0.66
125	21	6 3 38.4	+53 4 36.49	(7)	+31.74	+ 3.92	− 0.03	+53 5 12.12	+0.83
126	21	8 0 53.4	36.49	(7)	+31.76	− 51.71	− 4.98	+53 4 11.56	+0.06
127	22	5 41 33.5	+52 52 14.15	(22)	32.07	− 2.84	+ 0.99	+52 52 44.37	−0.13
128	22	5 47 51.5	14.15	(22)	32.07	− 5.75	+ 0.63	52 41.10	+0.03
129	22	7 16 56.3	14.15	(22)	32.08	− 50.54	− 3.65	51 52.04	−0.39
130	22	7 58 39.6	14.15	(22)	+32.09	− 71.91	− 5.00	+52 51 29.33	−0.25
131	27	5 47 59.8	+51 36 31.39	(3)	+33.50	+ 4.48	− 0.32	+51 37 9.05	−0.67
132	27	5 59 56.3	31.39	(3)	33.50	− 3.62	− 0.93	37 0.34	−0.92
133	27	7 44 0.2	31.39	(3)	33.51	− 73.09	− 4.86	35 46.95	−0.51
134	27	7 52 6.1	+51 34 5.14	(1½)	+33.51	+ 68.30	− 5.05	+51 35 41.90	+0.19
135	27	.. ..	+51 30 0.92	(5)	.....	.....	....	.. ..	....
136	30	5 35 0.1	+50 41 35.4	(1)	+34.08	+ 73.64	− 0.03	+50 43 23.1	−0.1
137	30	5 42 41.2	+50 42 0.70	(11)	34.10	+ 42.35	− 0.43	43 16.72	−0.46
138	30	7 57 55.0	+50 41 35.4	(1)	34.09	− 34.26	− 5.08	41 30.2	−0.2
139	30	8 1 18.9	+50 42 0.70	(11)	34.12	− 62.72	− 5.13	41 26.97	−0.76
140	30	15 1 35.9	+50 38 4.59	(8)	+34.16	−176.80	+11.44	+50 35 53.39	−0.52

* Ephemeris changed from A to B.

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Observations in Right Ascension—Continued.

No.	Date.	Washington Mean Time.	Comparison Star α 1900.0	Weight.	Ap. Pl. Red.	$\Delta\alpha$	Parallax.	Geocentric α.	O–C
	1900	h m s	h m s		s	s	s	h m s	s
141	Nov. 30	15 14 39.8	1 27 32.188	(8)	+6.196	− 6.287	+2.161	1 27 34.258	−0 [illegible]
142	Dec. 1	5 26 52.1	1 26 59.910	(20)	6.163	+13.840	−1.658	27 18.255	−0 213
143	1	5 37 46.7	59.910	(20)	6.163	+13.567	−1.589	27 18.051	−0 227
144	1	6 56 49.9	59.910	(20)	6.163	+11.580	−0.993	27 16.660	−0 248
145	1	7 13 9.0	59.910	(20)	+6.162	+11.184	−0.853	1 27 16.403	−0 225
146	1	14 58 20.2	1 26 53.154	(11)	+6.150	+ 7.249	+2.164	1 27 8.717	−0 [illegible]
147	1	15 11 21.6	1 27 9.911	(12)	6.152	− 9.700	+2.153	27 8.516	−0 [illegible]
148	2	5 19 58.0	1 26 53.324	(3)	6.131	− 1.367	−1.669	26 56.419	−0 326
149	2	5 33 19.5	1 26 50.545	(1½)	6.128	+ 1.216	−1.585	26 56.304	−0 270
150	2	5 43 37.0	1 26 53.324	(3)	+6.131	− 1.824	−1.517	1 26 56.114	−0 329
151	2	15 17 8.6	1 26 58.666	(3)	+6.118	−17.580	+2.133	1 26 49.337	−0 [illegible]
152	8	6 32 46.4	1 27 3.085	(4)	5.924	− 0.453	−0.937	27 7.619	−0 274
153	8	6 44 11.8	1 26 56.776	(10)	5.919	+ 6.006	−0.842	27 7.859	−0. 208
154	8	7 22 11.3	56.776	(10)	5.919	+ 6.256	−0.509	27 8.442	−0. 207
155	8	14 19 56.2	1 27 16.648	(13)	+5.915	− 9.604	+2.111	1 27 15.070	−0. 278
156	10	5 39 31.4	1 28 2.268	(7)	+5.870	− 3.693	−1.287	1 28 3.158	−0 262
157	10	5 43 17.6	2.268	(7)	5.870	− 3.687	−1.260	28 3.191	−0. 320
158	10	5 53 37.2	1 28 1.826	(7)	5.865	− 3.019	−1 183	28 3.489	−0. 270
159	10	6 59 39.5	1.826	(7)	5.865	− 1.967	−0.642	28 5.082	−0. 274
160	10	14 4 49.0	1 28 14.75	(1)	+5.859	− 7.001	+2.090	1 28 15.70	−0 26
161	10	14 9 26.9	14.75	(1)	+5.859	− 6.895	+2.091	1 28 15.81	−0 27
162	11	5 21 27.6	1 28 35.716	(7)	5.841	+ 0.241	−1.385	28 40.413	−0. 300
163	11	5 24 47.8	35.716	(7)	5.841	+ 0.299	−1.362	28 40.494	−0. 314
164	11	5 36 27.8	35.716	(7)	5.841	+ 0.572	−1.279	28 40.850	−0. 290
165	11	7 13 54.8	35.716	(7)	+5.840	+ 2.612	−0.485	1 28 43.683	−0. 245
166	11	14 48 48.8	1 28 59.764	(5)	+5.835	−10.663	+2.045	1 28 56.981	−0. 343
167	11	14 53 54.9	1 28 [51.78]	..	5.830	− 2.445	+2.036	. .. .	...
168	12	5 11 26.5	1 29 30.430	(14)	5.820	−10.702	−1.423	29 24.125	−0. 329
169	12	5 16 32.8	30.430	(14)	5.821	−10.496	−1.389	29 24.366	−0. 255
170	12	7 6 41.1	1 29 30.942	(4)	+5.817	− 8.307	−0.518	1 29 27.934	−0. 315
171	12	7 11 47.3	30.942	(4)	+5.817	− 8.172	−0.473	1 29 28.114	−0. 304
172	13	5 28 49.0	1 30 1.12	(1)	5.790	+ 9.489	−1.276	30 15.12	−0. 27
173	13	5 33 41.9	1 30 [15.97]	..	5.795	− 5.230	−1.241	. .. .	.....
174	13	5 45 14.0	1 30 1.12	(1)	5.790	+ 9.952	−1.156	1 30 15.71	−0. 30
175	13	7 25 34.2	1 30 [15.85]	..	+5.792	− 1.853	−0.321	. .. .	... .
176	13	7 28 28.9	1 30 11.22	(1)	+5.790	+ 1.221	−0.295	1 30 17.94	[−1.91]
177	13	13 46 29.5	1 30 [26.22]	..	5.785	− 0.093	+2.055	. .. .	.....
178	13	13 52 0.8	1 30 26.620	(4)	5.783	− 0.280	+2.057	30 34.180	−0. 267
179	13	14 6 26.4	1 30 [26.22]	..	5.780	+ 0.839	+2.058	. .. .	.....
180	14	5 17 2.2	1 30 49.636	(9)	+5.766	+17.161	−1.330	1 31 11.233	−0. 211
181	14	5 25 19.1	1 31 12.726	(2)	+5.774	− 5.755	−1.272	1 31 11.473	−0. 314
182	14	7 11 2.5	12.726	(2)	5.773	− 2.201	−0.421	31 15.877	−0. 301
183	14	7 14 48.2	1 31 16.197	(7)	5.770	− 5.520	−0.388	31 16.059	−0. 276
184	14	13 50 43.3	1 31 25.126	(19)	5.765	− 0.178*	+2.047	31 32.760	−0. 316
185	14	13 56 53.7	25.126	(19)	+5.764	+ 0.140*	+2.047	1 31 33.077	−0. 264
186	15	5 4 20.9	1 32 20.570	(18)	+5.754	−11.778	−1.388	1 32 13.158	−0. 296
187	15	5 14 43.1	20.570	(18)	5.754	−11.332	−1.319	32 13.673	−0. 253
188	15	7 21 9.4	20.570	(18)	5.753	− 6.553	−0.305	32 19.465	−0. 244
189	15	7 25 23.0	1 32 [7.37]	..	5.749	+ 6.788	−0.268	. .. .	.....
190	16	5 18 40.6	1 32 52.887	(12)	+5.727	+25.096	−1.265	1 33 22.445	−0. 258
191	16	5 24 5.8	1 33 [14.55]	..	+5.733	+ 3.653	−1.227	. .. .	.....
192	16	7 25 5.4	1 33 [17.93]	..	5.729	+ 5.332	−0.244	. .. .	.....
193	16	7 35 9.5	1 33 36.706	(2)	5.733	−13.089	−0.155	1 33 29.195	−0. 318
194	16	14 29 48.2	1 33 43.206	(5)	5.725	− 0.695*	+1.997	33 50.233	−0. 291
195	18	5 37 49.5	1 35 38.718	(16)	+5.695	+15.068	−1.076	1 35 58.405	−0. 232

* Sign of $\Delta\alpha$ changed from that originally published.

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Observations in Declination—Continued.

No.	Date.	Washington Mean Time.	Comparison Star δ 1900.0	Weight.	Ap. Pl. Red.	Δδ	Parallax.	Geocentric δ.	O–C
	1900	h m s	° ′ ″		″	″	″	° ′ ″	″
141	Nov. 30	15 10 19.7	+50 38 4.59	(8)	+34.16	−184.79	+12.05	+50 35 46.01	−0.94
142	Dec. 1	5 30 9.7	+50 22 1.03	(20)	34.27	+ 98.54	+ 0.11	24 13.95	−0.78
143	1	5 34 27.3	1.03	(20)	34.27	+ 95.22	− 0.12	24 10.40	−0.84
144	1	7 0 33.5	1.03	(20)	34.28	+ 29.04	− 3.72	23 0.63	−0.62
145	1	7 9 27.8	1.03	(20)	+34.28	+ 21.97	− 3.98	+50 22 53.30	−0.71
146	1	15 3 19.7	+50 16 11.32	(11)	+34.33	− 31.79	+11.98	+50 16 25.84	−0.78
147	1	15 7 14.8	+50 14 11.09	(12)	34.30	+ 85.64	+12.26	16 23.29	−0.11
148	2	5 22 58.5	+50 4 59.26	(3)	34.39	− 59.82	+ 0.39	4 34.22	−0.63
149	2	5 36 36.2	+50 2 45.82	(1½)	34.38	+ 63.43	− 0.32	4 23.31	−0.16
150	2	5 40 6.9	+50 4 59.26	(3)	+34.39	− 73.10	− 0.50	+50 4 20.05	−0.49
151	2	15 12 59.9	+49 55 44.51	(3)	+34.42	− 13.12	+13.06	+49 56 18.87	−0.87
152	8	6 36 0.1	+47 55 41.20	(4)	34.81	− 86.01	− 2.81	+47 54 47.19	−0.59
153	8	6 40 37.4	+47 52 26.50	(10)	34.81	+104.68	− 2.94	54 43.05	−0.35
154	8	7 25 28.8	26.50	(10)	34.81	+ 63.20	− 3.93	54 0.58	−0.38
155	8	14 16 41.8	+47 47 31.79	(13)	+34.80	− 47.40	+11.45	+47 47 30.64	−0.27
156	10	5 36 13.2	+47 10 19.12	(7)	+34.79	− 73.64	− 0.57	+47 9 39.70	−0.93
157	10	5 46 42.1	19.12	(7)	34.78	− 83.12	− 1.00	9 29.78	−0.64
158	10	5 50 2.8	+47 7 1.27	(7)	34.78	+112.21	− 1.13	9 27.13	−0.04
159	10	6 56 26.6	1.27	(7)	34.79	+ 49.47	− 3.18	8 22.35	−0.17
160	10	14 1 0.8	+47 1 25.5	(1)	+34.78	− 43.36	+11.07	+47 1 28.0	−0.2
161	10	14 13 31.0	25.5	(1)	+34.78	− 56.78	+11.93	+47 1 15.4	−0.5
162	11	5 18 20.6	+46 45 26.23	(7)	34.76	+ 26.02	+ 0.24	+46 46 27.25	−0.31
163	11	5 28 5.8	26.23	(7)	34.76	+ 16.69	− 0.20	46 17.48	−0.47
164	11	5 33 38.1	26.23	(7)	34.76	+ 11.40	− 0.43	46 11.96	−0.53
165	11	7 17 34.3	26.23	(7)	+34.77	− 88.18	− 3.45	+46 44 29.37	−0.61
166	11	14 45 6.8	+46 38 24.76	(5)	+34.74	−127.43	+14.40	+46 37 6.47	−1.12
167	11	14 56 25.2	+46 35 [43.9]	..	34.73	+ 21.91	+15.16	.. ..	....
168	12	5 8 1.7	+46 22 51.60	(14)	34.70	− 37.61	+ 0.73	22 49.42	−0.65
169	12	5 19 49.6	51.60	(14)	34.70	− 48.64	+ 0.19	22 37.85	−0.45
170	12	7 3 46.4	+46 20 1.42	(4)	+34.69	+ 21.20	− 3.10	+46 20 54.21	−0.40
171	12	7 14 55.4	1.42	(4)	+34.69	+ 10.09	− 3.28	+46 20 42.92	−0.56
172	13	5 25 33.6	+45 57 22.1	(1)	34.66	+ 31.55	− 0.03	+45 58 28.3	−0.5
173	13	5 37 0.9	+45 58 [23.0]	..	34.64	− 40.54	− 0.50	.. ..	....
174	13	5 41 59.8	+45 57 22.1	(1)	34.66	+ 15.38	− 0.69	+45 58 11.5	−0.7
175	13	7 22 44.2	+45 56 [21.5]	..	+34.63	− 22.88	− 3.24	.. ..	....
176	13	7 31 15.9	+45 55 30.0	(1)	+34.64	+ 21.22	− 3.33	+45 56 22.5	[+0.4]
177	13	13 43 0.9	+45 49 [14.8]	..	34.61	+ 5.62	+10.84	.. ..	....
178	13	13 56 24.3	+45 47 32.54	(4)	34.61	+ 93.50	+11.74	49 52.39	−0.65
179	13	14 3 14.6	+45 49 [14.8]	..	34.61	− 16.74	+12.20	.. ..	....
180	14	5 11 42.7	+45 31 9.60	(9)	+34.58	+159.10	+ 0.62	+45 34 23.90	−0.64
181	14	5 29 7.1	+45 34 46.52	(2)	+34.55	− 75.56	− 0.13	+45 34 5.38	−1.45
182	14	7 5 47.7	46.52	(2)	34.56	−170.46	− 2.87	32 27.75	−0.68
183	14	7 18 26.6	+45 29 59.63	(7)	34.54	+103.80	− 3.04	32 14.93	−0.62
184	14	13 47 16.3	+45 26 52.17	(19)	34.53	−120.00*	+11.44	25 38.14	−1.05
185	14	14 1 0.5	52.17	(19)	+34.53	−135.32*	+12.36	+45 25 23.74	−1.43
186	15	5 1 3.9	+45 9 17.86	(18)	+34.44	+ 9.84	+ 1.14	+45 10 3.28	−0.74
187	15	5 17 47.8	17.86	(18)	34.44	− 6.79	+ 0.40	9 45.91	−0.94
188	15	7 17 29.8	17.86	(18)	34.44	−126.44	− 2.87	+45 7 42.99	−0.98
189	15	7 28 47.4	+45 8 [12.7]	..	34.46	− 72.50	− 2.98	.. ..	....
190	16	5 12 57.1	+44 44 29.37	(12)	+34.37	+ 2.83	+ 0.66	+44 45 7.23	−1.02
191	16	5 27 24.3	+44 45 [25.4]	..	+34.34	− 67.20	+ 0.06	.. ..	....
192	16	7 21 17.9	+44 42 [28.4]	..	34.33	− 5.16	− 2.75	.. ..	....
193	16	7 39 18.9	+44 42 15.78	(2)	34.30	− 10.80	− 2.86	+44 42 36.42	−0.41
194	16	14 27 36.8	+44 34 51.51	(5)	34.28	− 7.21*	+14.70	+44 35 33.28	−0.55
195	18	5 33 5.3	+43 53 44.76	(16)	+34.06	+ 29.07	+ 0.01	+43 54 47.90	−0.77

* Sign of Δδ changed from that originally published.

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Observations in Right Ascension—Continued.

No.	Date.	Washington Mean Time.	Comparison Star α1900.0	Weight.	Ap. Pl. Red.	$\Delta\alpha$	Parallax.	Geocentric α.	O–C
	1900	h m s	h m s		s	s	s	h m s	s
196	Dec. 18	5 44 37.6	1 35 57.580	(5)	+5.699	− 3.512	−1.025	1 35 58.742	−0.288
197	18	5 54 59.4	1 35 54.262	(3)	5.698	+ 0.375	−0.946	35 59.389	−0.241
198	18	7 53 27.1	54.262	(3)	5.696	+ 6.272	+0.053	36 6.283	−0.221
199	19	5 17 43.5	1 37 19.968	(6)	5.683	− 1.208	−1.196	37 23.247	−0.253
200	19	5 25 34.5	19.968	(6)	+5.683	− 0.792	−1.140	1 37 23.719	−0.266
201	19	7 7 31.2	19.968	(6)	+5.682	+ 4.711	−0.324	1 37 30.037	−0.253
202	19	7 13 28.6	19.968	(6)	5.682	+ 5.012	−0.273	37 30.389	−0.270
203	20	5 31 21.1	1 38 56.498	(10)	5.674	− 5.371	−1.075	1 38 55.726	−0.288
204	20	5 39 35.1	1 38 [40.02]	..	5.666	+11.632	−1.014	. .. .	.
205	20	6 36 58.2	[40.02]	..	+5.665	+14.926	−0.560	. .. .	. ..
206	21	5 34 41.8	1 40 [44.02]	..	+5.659	−15.492	−1.027	. .. .	....
207	21	5 42 10.1	1 40 [41.66]	..	5.657	−12.666	−0.971	. .. .	....
208	21	7 18 17.8	[41.66]	..	5.656	− 6.739	−0.188	. .. .	. .
209	21	13 41 50.4	1 40 47.612	(7)	5.648	+12.174	+1.965	1 41 7.399	[−0.109]
210	24	5 14 58.6	1 45 50.488	(9)	+5.626	− 0.061	−1.102	1 45 54.951	−0.236
211	24	5 19 12.9	50.488	(9)	+5.625	+ 0.200	−1.072	1 45 55.241	−0.286
212	29	5 35 2.8	1 56 15.916	(2)	5.588	+13.221	−0.863	1 56 33.862	−0.202
213	29	5 40 58.3	1 56 [36.24]	..	5.591	− 6.593	−0.820	. .. .	...
214	29	7 9 28.9	[36.24]	..	5.587	+ 1.218	−0.125	. .. .	....
215	29	7 14 3.6	1 56 [44.64]	..	+5.592	− 6.750	−0.087	. .. .	...
216	29	13 38 33.3	1 57 15.564	(10)	+5.585	− 2.398	+1.865	1 57 20.616	[−0.305]
	1901								
217	Jan. 2	7 11 7.5	2 6 29.363	(1)	5.578	− 2.531	−0.061	2 6 32.349	[−0.308]
218	3	5 35 1.7	2 8 59.472	(6)	5.578	− 5.423	−0.784	8 58.843	−0.236
219	3	5 41 49.5	2 8 59.112	(3)	5.576	− 4.274	−0.735	8 59.679	−0.148
220	3	5 54 26.6	2 8 58.067	(1)	+5.573	− 1.953	−0.642	2 9 1.045	−0.173
221	3	7 15 37.4	58.067	(1)	+5.572	+ 6.380	−0.015	2 9 10.004	−0.163
222	4	5 30 26.9	2 11 36.622	(13)	5.571	− 2.643	−0.802	11 38.748	−0.199
223	4	5 33 53.7	36.622	(13)	5.571	− 2.290	−0.778	11 39.125	−0.210
224	4	6 29 31.3	36.622	(13)	5.571	+ 3.592	−0.364	11 45.421	−0.180
225	4	6 32 56.1	36.622	(13)	+5.571	+ 3.942	−0.338	2 11 45.797	−0.189
226	5	5 30 30.2	2 14 24.778	(13)	+5.571	− 6.972	−0.788	2 14 22.589	−0.214
227	5	5 35 31.7	24.778	(13)	5.571	− 6.421	−0.752	14 23.176	−0.204
228	5	6 41 37.4	24.778	(13)	5.569	+ 0.695	−0.260	14 30.782	−0.202
229	5	6 44 25.7	2 14 24.070	(4)	5.569	+ 1.749	−0.238	14 31.150	−0.157
230	5	12 45 13.3	2 15 2.319	(12)	+5.570	+ 3.059	+1.769	2 15 12.717	−0.217
231	5	12 50 25.9	2.319	(12)	+5.570	+ 3.667	+1.774	2 15 13.330	−0.206
232	8	6 21 58.8	2 22 50.400	(10)	5.567	+ 4.623	−0.377	23 0.213	−0.163
233	8	6 26 39.2	50.400	(10)	5.567	+ 5.148	−0.342	2 23 0.773	−0.172
234	9	6 1 30.2	2 25 [43.57]	..	5.566	+ 5.800	−0.518	. .. .	..
235	9	6 5 43.5	[43.57]	..	+5.566	+ 6.280	−0.487	. .. .	.. .
*236	13	5 59 24.7	2 37 [55.55]	..	+5.563	+ 8.627	−0.493	. .. .	....
237	13	6 4 14.4	[55.55]	..	5.563	+ 9.199	−0.459	. .. .	.
238	13	12 11 27.4	2 38 [56.17]	..	5.564	− 5.217	+1.638	. .. .	. ..
239	13	12 16 36.6	[56.17]	..	5.564	− 4.516	+1.647	. .. .	....
240	15	6 23 55.3	2 44 37.159	(9)	+5.566	− 6.779	−0.302	2 44 35.644	+0.003
241	15	6 28 56.3	37.159	(9)	+5.566	− 6.125	−0.266	2 44 36.334	+0.018
242	16	5 55 40.4	2 47 54.06	(1)	5.565	−12.159	−0.482	47 46.986	+0.032
243	16	6 46 32.9	54.06	(1)	5.565	− 5.605	−0.133	47 53.889	0.000
244	19	6 18 12.4	2 57 32.071	(6)	5.562	+11.302	−0.316	57 48.619	−0.004
245	19	6 24 11.4	32.071	(6)	+5.562	+12.098	−0.274	2 57 49.457	−0.008
246	20	6 17 39.3	3 1 3.250	(3)	+5.563	+ 3.678	−0.313	3 1 12.178	+0.019
247	20	6 22 18.2	3.250	(3)	5.563	+ 4.265	−0.281	3 1 12.797	−0.023
248	22	6 42 7.3	3 7 [59.25]	..	5.559	+ 3.863	−0.135	. .. .	. ..
249	22	6 47 31.1	[59.25]	..	5.559	+ 4.566	−0.097	. .. .	....
250	29	6 53 4.0	3 33 [6.85]	..	+5.551	− 8.921	−0.045	. .. .	....

* Ephemeris changed from B to C.

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Observations in Declination—Continued.

No.	Date.	Washington Mean Time.	Comparison Star δ 1900.0	Weight.	Ap. Pl. Red.	$\Delta\delta$	Parallax.	Geocentric δ.	O–C
	1900	h m s	° ′ ″		″	″	″	° ′ ″	″
196	Dec. 18	5 48 19.9	+43 54 27.77	(5)	+34.04	− 28.85	− 0.52	+43 54 32.44	−0.26
197	18	5 52 17.1	+43 52 48.36	(3)	34.04	+ 66.32	− 0.64	54 28.08	−0.57
198	18	7 56 48.8	48.36	(3)	34.04	− 62.83	− 2.48	52 17.09	−0.96
199	19	5 13 12.0	+43 28 14.22	(6)	33.87	+ 67.74	+ 0.85	29 56.68	−0.24
200	19	5 28 46.1	14.22	(6)	+33.87	+ 51.98	+ 0.26	+43 29 40.33	−0.20
201	19	7 4 1.8	14.22	(6)	+33.87	− 46.18	− 2.06	+43 27 59.85	−0.34
202	19	7 16 31.5	14.22	(6)	33.87	− 59.28	− 2.18	27 46.63	−0.40
203	20	5 25 23.1	+43 7 27.38	(10)	33.70	−218.05	+ 0.48	+43 4 23.51	−0.63
204	20	5 44 46.1	+43 1 [55.7]	..	33.71	+ 93.69	− 0.18	.. ..	....
205	20	6 32 59.5	[55.7]	..	+33.70	+ 43.98	− 1.42	.. ..	....
206	21	5 30 24.1	+42 38 [41.1]	..	+33.48	− 23.18	+ 0.40	.. ..	....
207	21	5 46 34.0	+42 36 [2.6]	..	33.47	+118.43	− 0.12	.. ..	....
208	21	7 14 37.5	[2.6]	..	33.47	+ 26.99	− 1.80	.. ..	....
209	21	13 50 11.8	+42 28 34.99	(7)	33.45	+ 39.99	+13.53	+42 30 1.96	[+0.57]
210	24	5 13 2.1	+41 21 46.51	(9)	+32.82	+ 1.42	+ 1.35	+41 22 22.10	−0.58
211	24	5 21 35.6	46.51	(9)	+32.82	− 7.52	+ 1.05	+41 22 12.86	−0.66
212	29	5 30 23.5	+39 11 43.84	(2)	31.43	+ 53.66	+ 1.44	+39 13 10.37	[−1.43]
213	29	5 45 0.2	+39 9 [46.1]	..	31.39	+156.79	+ 1.05	.. ..	....
214	29	7 5 16.4	[46.1]	..	31.40	+ 71.61	− 0.18	.. ..	....
215	29	7 17 53.6	+39 11 [31.8]	..	+31.39	− 47.62	− 0.22	.. ..	....
216	29	13 33 49.4	+38 58 25.57	(10)	+31.28	+321.94	+13.60	+39 4 32.39	[+0.60]
	1901								
217	Jan. 2	7 7 2.3	+37 29 27.61	(1)	30.03	−106.10	+ 0.63	37 28 12.17	−0.50
218	3	5 26 46.7	+37 8 17.27	(6)	29.70	−277.57	+ 2.30	4 11.70	−1.01
219	3	5 46 49.4	+37 5 27.45	(3)	29.69	−128.16	+ 1.82	3 50.80	−0.37
220	3	5 51 20.0	+37 1 42.20	(1)	+29.67	+ 91.90	+ 1.72	+37 3 45.49	−0.84
221	3	7 20 33.1	42.20	(1)	+29.67	− 2.84	+ 0.82	+37 2 9.85	−0.60
222	4	5 27 0.1	+36 36 46.88	(13)	29.31	+ 66.07	+ 2.45	36 38 24.71	−0.84
223	4	5 36 42.8	46.88	(13)	29.31	+ 55.75	+ 2.21	38 14.15	−0.96
224	4	6 26 59.3	46.88	(13)	29.30	+ 2.68	+ 1.32	37 20.18	−0.95
225	4	6 35 33.6	46.88	(13)	+29.30	− 6.62	+ 1.23	+36 37 10.79	−1.14
226	5	5 26 54.5	+36 11 32.81	(13)	+28.91	+ 34.22	+ 2.62	+36 12 38.56	−0.93
227	5	5 38 40.6	32.81	(13)	28.90	+ 21.92	+ 2.33	12 25.96	−0.91
228	5	6 38 55.1	32.81	(13)	28.90	− 42.23	+ 1.39	11 20.87	−1.33
229	5	6 47 14.7	+36 9 51.93	(4)	28.90	+ 50.21	+ 1.32	11 12.36	−0.91
230	5	12 40 28.8	+36 6 15.66	(12)	+28.81	−123.77	+12.12	+36 4 52.82	−1.34
231	5	12 54 0.2	15.66	(12)	+28.81	−138.61	+12.87	+36 4 38.73	−0.91
232	8	6 18 13.3	+34 55 10.77	(10)	27.68	− 69.02*	+ 2.18	34 54 31.61	−1.20
233	8	6 29 48.4	10.77	(10)	27.68	− 81.63	+ 2.05	+34 54 18.87	−1.54
234	9	5 58 13.6	+34 29 [5.0]	..	27.24	− 22.69	+ 2.64	.. ..	....
235	9	6 8 27.2	[5.0]	..	+27.24	− 34.59	+ 2.49	.. ..	....
†236	13	5 55 21.7	+32 46 [24.3]	..	+25.40	− 4.69	+ 3.40	.. ..	....
237	13	6 7 22.7	[24.3]	..	25.40	− 18.06	+ 3.23	.. ..	....
238	13	12 7 37.7	+32 39 [30.8]	..	25.26	+ 4.51	+11.44	.. ..	....
239	13	12 20 22.2	[30.8]	..	25.26	− 9.76	+12.06	.. ..	....
240	15	6 21 8.0	+31 56 20.18	(9)	+24.39	− 87.28	+ 3.44	+31 55 20.73	+1.29
241	15	6 31 26.3	20.18	(9)	+24.39	− 99.00	+ 3.35	+31 55 8.92	+0.41
242	16	5 51 43.9	+31 28 50.90	(1)	23.87	+ 67.34	+ 3.97	30 26.08	+1.57
243	16	6 50 46.1‡	50.90	(1)	23.87	+ 4.71	+ 3.44	31 29 22.92	+0.92
244	19	6 14 10.2	+30 15 4.88	(6)	22.35	− 90.05	+ 4.21	30 14 1.39	+0.58
245	19	6 28 17.3	4.88	(6)	+22.35	−104.86	+ 4.10	+30 13 46.47	+0.52
246	20	6 13 52.8	+29 50 36.10	(3)	+21.79	−134.10	+ 4.39	+29 48 48.18	+0.27
247	20	6 25 59.7	36.10	(3)	21.80	−147.09	+ 4.29	+29 48 35.10	−0.09
248	22	6 39 16.3	+28 56 [45.7]	..	20.66	+ 55.77	+ 4.56	.. ..	....
249	22	6 50 55.0	[45.7]	..	20.66	+ 44.13	+ 4.53	.. ..	....
250	29	6 49 9.1	+26 6 [52.2]	..	+16.56	−174.70	+ 5.68	.. ..	....

* $\Delta\delta$ changed 1″, error in original reduction.

† Ephemeris changed from B to C.

‡ Time of $\Delta\delta$ decreased $2^m\ 30^s$ from that originally published

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It was the purpose of the Paris Conference to treat the observations of Eros made at all observatories in a comprehensive manner. But it is not out of place for each observatory to make a preliminary discussion of its own observations and determine a value of the solar parallax.

It is important to determine a proper system of weights to be applied to the observations. For this purpose it is necessary to determine the mean error of a measurement, asteroid minus star, and the mean error of a star place. From those cases where a number of observations were made using the same comparison star the mean error of a measurement may be obtained by studying the ephemeris residuals. These determinations were classified according to the observer's estimated weights, which were printed with the observations as originally published, Volume III of the Publications of the United States Naval Observatory, Second Series. But no difference was shown in the quality of the observations, which would correspond with the scale of weighting. Therefore these weights may be neglected. The following is a tabulation of the results obtained:

Weight assigned by Observer.	α				Weight assigned by Observer.	δ			
	Ephemeris A.		Ephemeris B.			Ephemeris A.		Ephemeris B.	
	ϵ	No. of Determinations.	ϵ	No. of Determinations.		ϵ	No. of Determinations.	ϵ	No. of Determinations.
	″		″			″		″	
1	0.29	1	....	..	1	0.12	1	....	..
1.5	0.26	3	....	..	1.5	0.15	3	....	..
2	0.16	5	0.12	3	2	0.26	5	0.15	2
2.5	0.12	2	0.08	2	2.5	0.44	1	0.17	1
3	0.25	14	0.17	20	3	0.20	15	0.18	20
3.5	....	..	0.22	1	3.5	....	..	0.18	1
4	0.10	1	0.39	1	4	0.26	1	0.06	1
Mean ϵ =	0.22	26	0.17	27	Mean ϵ =	0.23	26	0.17	25
" r =	0.15		0.11		" r =	0.15		0.11	

General mean ϵ=0″.20; r=0″.13.

From this it would appear that the observations in right ascension are practically of the same accuracy as those in declination. But the observations through the first half of the work, Ephemeris A, are not as good as those of the last half. It should be noted that after the completion of the work which was compared with Ephemeris A, and before beginning that which was compared with Ephemeris B, a small burr was removed from the micrometer, see page A v, Volume III, Publications of the United States Naval Observatory, Second Series.

The mean error of an observed position of Eros was obtained by studying the residuals from a smooth curve which was drawn through the platted ephemeris corrections (O–C). But since the star places have different weights this quantity should be a variable, depending upon the value of the star places.

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Let

$P_\star$ = the weight of a star place.
$\varepsilon_{\star 1}$ = the mean error of a star place of weight unity.
$\varepsilon_{o-\star}$ = the mean error of a measurement (asteroid − star) = a constant.
ε_o = the mean error of an observed position of the asteroid.

Thus we have

$$\varepsilon^2{}_{o-\star} + \frac{\varepsilon^2{}_{\star 1}}{P_\star} = \varepsilon^2{}_o.$$

Now, if we take the residuals from the smooth curve mentioned above, and classify them according to the star weights, we may determine a value of $\varepsilon^2{}_o$ for each weight. Thus we should have a series of observation equations from which to determine $\varepsilon_{o-\star}$ and $\varepsilon_{\star 1}$. This depends upon the assumption that the scale of star weights is mathematically right. But it would make little difference, ultimately, whether the scale were right or not. In this way we obtain

Right Ascensions { Ephemeris A { $\varepsilon_{o-\star} = 0''.27$, $\varepsilon_{\star 1} = 0''.25$ } Ephemeris B { $\varepsilon_{o-\star} = 0''.30$, $\varepsilon_{\star 1} = 0''.33$ } } Mean for α { $\varepsilon_{o-\star} = 0''.285$, $\varepsilon_{\star 1} = 0''.290$ } General mean { $\varepsilon_{o-\star} = 0''.30$, $\varepsilon_{\star 1} = 0''.26$

Declinations { Ephemeris A { $\varepsilon_{o-\star} = 0''.34$, $\varepsilon_{\star 1} = 0''.18$ } Ephemeris B { $\varepsilon_{o-\star} = 0''.29$, $\varepsilon_{\star 1} = 0''.28$ } } Mean for δ { $\varepsilon_{o-\star} = 0''.315$, $\varepsilon_{\star 1} = 0''.230$

Whence

$$r_{o-\star} = 0''.20, \quad r_{\star 1} = 0''.18$$

In these determinations all residuals greater than $0''.7$ were rejected in computing the values of $\varepsilon^2{}_o$, with the exception of Ephemeris A in declination, where the limit was set at $0''.8$ as there was an unusual number of large residuals, especially in the higher weights.

It is seen that the probable error of a measurement between the asteroid and a star determined in this way is 50 per cent greater than that obtained by intercomparing measurements made on a single star. But this is what should be expected, since all systematic errors, both in the star places and in the quantities (asteroid — star), would be largely independent of the scale of star weights, and consequently they would be added to the constant term ($\varepsilon^2{}_{o-\star}$) in the above equation. Thus we should regard the value $r_{\star 1} = 0''.18$ as only that portion of the probable error of a star place of weight unity which corresponds to the scale of weights; and an unknown constant, which is independent of the scale of weighting, has been shifted to the probable error of a measurement ($r_{o-\star}$).

Now, in order to settle upon a proper scheme of weighting with which to determine mean corrections to the ephemeris, and the value of the solar parallax, we may assume that the systematic errors will be partly eliminated on account of the shorter periods of time involved.

Thus, for practical purposes, we may take as the basis of the scheme of weighting

$$\varepsilon_{o-\star} = \varepsilon_{\star 1}.$$

That is, the precision of a single observed difference (asteroid — star) is assumed to be the same as that of a star place of weight unity. The weights may then be computed from the following formula:

$$P_o = \frac{nP_\star}{n + P_\star},$$

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where

P_o = the weight of the mean of n observations of the asteroid, all with a single comparison star.

$P_\star$ = the weight of the star place.

n = the number of observations made with a single comparison star.

For convenience in making computations the following table was constructed:

Weight of Mean of n Observations.

n \ Star Wt.	1	2	3	4	5	6	7	8	9	10	11	12
1	0.5	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9
2	0.7	1.0	1.2	1.3	1.4	1.5	1.6	1.6	1.6	1.7	1.7	1.7
3	0.8	1.2	1.5	1.7	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.4
4	0.8	1.3	1.7	2.0	2.2	2.4	2.6	2.7	2.8	2.9	2.9	3.0

n \ Star Wt.	13	14	15	16	17	18	19	20	21	22	23	24
1	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
2	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
3	2.4	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.7
4	3.1	3.1	3.2	3.2	3.2	3.3	3.3	3.3	3.4	3.4	3.4	3.4

In assigning weights to individual observations from the table it is necessary to divide the weight of the mean, which is given by the table, by the number of observations which were made with a single comparison star.

The weighted means of the ephemeris corrections (O–C) and their corresponding parallaxes were computed for each date, and, lest there be some ambiguity on account of the rejection of certain erratic cases, it was thought necessary to print the exact data used in the computations. Thus, in the following pages we have printed the number of the observation, the date, parallax, ephemeris residual (O–C), and weight. A brace is placed after certain residuals to indicate those which depend upon a single comparison star. From the daily means similar weighted means were determined for groups, the division into groups being governed principally by breaks in the series of observations.

The group means of the ephemeris corrections were plotted upon cross-section paper and a smooth curve was drawn which would represent them. Ephemeris corrections were then scaled from this curve and are given in Table II, see page B 65.

When the curve had been traced it was seen that its curvature in passing through some of the groups would effect the mean; thus, a correction should be applied if we wish the mean of the group to represent an ephemeris correction at the mean epoch of the group. These corrections, when appreciable, are given beneath the group means, where they are indicated by the letter ρ, and are included in the values given in Table I, see page B 64.

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Parallax and Ephemeris Residuals with Weighted Means, by Dates.

No.	α					δ				
	Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	s	s		1900	d	″	″	
1	Oct.	9.563	−1.315	−0.097	(0.9)	Oct.	9.567	+6.93	+1.52	(0.9)
2		.571	−1.313	[0.001]	...		.574	+6.50	0.75	(0.6)
3		.608	−1.266	0.076	(0.8)		.611	+4.27	0.95	(0.6)
4		.614	−1.250	0.080	(0.9)		.618	+3.87	1.17	(0.9)
5		.979	+1.121	0.098	(0.8)		.983	+2.36	+1.51	(0.9)
6		.987	+1.176	−0.100	(0.8)		....	....	....	...
	Mean..	9.742	−0.353	−0.090	(4.2)	Mean..	9.683	+4.69	+1.23	(3.9)
7	Oct.	10.552	−1.337	−0.077	(0.7)	Oct.	10.555	+7.54	+1.18	(0.7)
8		.568	−1.338	0.082	(0.7)		.571	+6.53	1.19	(0.7)
9		.599	−1.300	0.087	(0.7)		.603	+4.56	1.18	(0.7)
10		.930	+0.927	0.098	(0.6)		.932	+0.08	1.01	(0.6)
11		.940	+0.985	0.121	(0.6)		.944	+0.50	1.42	(0.6)
12		.952	+1.050	−0.149	(0.6)		.955	+1.01	+1.36	(0.6)
	Mean..	10.743	−0.258	−0.101	(3.9)	Mean..	10.746	+3.59	+1.22	(3.9)
13	Oct.	11.599	−1.320	[−0.017]	...	Oct.	11.604	+4.26	+0.87	(0.9)
15		.940	+1.018	0.118	(0.6)		.943	+0.50	1.56	(0.6)
16		.953	+1.091	−0.083	(0.6)		.956	+1.14	+1.77	(0.6)
	Mean..	11.946	+1.054	−0.100	(1.2)	Mean..	11.801	+2.29	+1.32	(2.1)
17	Oct.	15.527	−1.456	−0.134	(0.8)	Oct.	15.529	+8.39	+1.84	(0.8)
18		.532	−1.461	0.105	(0.8)		.535	+7.99	1.85	(0.8)
19		.539	−1.465	0.139	(0.8)		.541	+7.63	1.60	(0.8)
20		.607	−1.356	0.137	(0.8)		.611	+2.98	1.65	(0.8)
21		.615	−1.328	0.076	(0.8)		.617	+2.56	1.28	(0.8)
22		.942	+1.182	0.135	(0.5)		.945	+1.01	1.42	(0.5)
23		.954	+1.250	0.093	(0.8)		.958	+1.75	1.14	(0.8)
24		.969	+1.319	−0.136	(0.8)		.972	+2.60	+1.57	(0.8)
	Mean..	15.699	−0.493	−0.119	(6.1)	Mean..	15.702	+4.53	+1.55	(6.1)
25	Oct.	16.540	−1.492	[−0.053]	...	Oct.	16.542	+7.31	+1.63	(0.8)
26		.566	−1.476	0.17	(0.4)		.568	+5.52	1.3	(0.4)
27		.608	−1.365	0.14	(0.4)		.612	+2.66	0.6	(0.4)
28		.957	+1.300	0.138	(0.9)		.960	+2.01	1.58	(0.9)
29		.968	+1.352	−0.145	(0.9)		.972	+2.73	+1.59	(0.9)
	Mean..	16.847	+0.048	−0.146	(2.6)	Mean..	16.778	+3.94	+1.45	(3.4)
33	Oct.	17.934	+1.222	−0.161	(0.9)	Oct.	17.938	+0.87	+1.28	(0.9)
35	Oct.	18.514	−1.531	−0.182	(0.9)	Oct.	18.517	+8.69	+1.10	(0.9)
36		.522	−1.540	0.124	(0.5)		.525	+8.12	0.84	(0.5)
37		.589	−1.454	0.103	(0.5)		.592	+3.42	1.47	(0.5)
38		.929	+1.230	0.076	(0.5)		.932	+0.61	1.76	(0.5)
39		.939	+1.290	0.123	(0.5)		.941	+1.22	1.22	(0.5)
40		.962	+1.404	0.191	(0.5)		.965	+2.68	1.32	(0.5)
41		.972	+1.441	−0.103	(0.5)		.974	+3.28	+1.27	(0.5)
	Mean..	18.748	−0.049	−0.134	(3.9)	Mean..	18.751	+4.48	+1.26	(3.9)
45	Oct.	19.929	+1.275	−0.121		Oct.	19.932	+0.76	+0.82	
46		.963	+1.446	0.161	(2.6)		.965	+2.88	1.26	(2.6)
47		.975	+1.491	−0.157			.977	+3.70	+0.95	
	Mean..	19.956	+1.404	−0.146	(2.6)	Mean..	19.958	+2.44	+1.01	(2.6)

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Parallax and Ephemeris Residuals with Weighted Means, by Dates—Continued.

No.	α					δ				
	Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	s	s		1900	d	″	″	
48	Oct.	20.503	−1.579	−0.173	(0.7)	Oct.	20.500	+9.54	+1.25	(0.7)
49		.586	−1.496	0.178	(0.7)		.588	+3.20	1.67	(0.7)
50		.593	−1.469	0.179	(0.7)		.595	+2.70	1.75	(0.7)
51		.605	−1.417	0.156	(0.7)		.607	+1.92	1.84	(0.7)
52		.934	+1.348	0.122	(0.8)		.939	+1.35	1.58	(0.7)
53		.964	+1.491	[−0.248]	...		.967	+3.25	+1.47	(0.7)
	Mean..	20.652	−0.860	−0.160	(3.6)	Mean..	20.699	+3.66	+1.59	(4.2)
54	Oct.	21.528	−1.626	−0.187		Oct.	21.530	+7.10	+1.34	
55		.538	−1.621	0.127	(2.4)		.540	+6.58	1.78	(2.4)
56		.590	−1.493	−0.160			.592	+2.63	+1.68	
	Mean..	21.552	−1.580	−0.158	(2.4)	Mean..	21.554	+5.44	+1.60	(2.4)
57	Oct.	22.514	−1.652	−0.142	(1.3)	Oct.	22.517	+7.89	+1.45	(1.3)
58		.557	−1.612	−0.180			.559	+4.67	+2.07	
	Mean..	22.536	−1.632	−0.161	(1.3)	Mean..	22.538	+6.28	+1.76	(1.3)
59	Oct.	24.522	−1.706	−0.192	(0.5)	Oct.	24.524	+6.79	+0.91	(0.5)
61		.607	−1.418	0.240	(0.5)		.610	+0.55	1.84	(0.5)
60		.527	−1.702	−0.241	(0.9)		.530	+6.38	+1.48	(0.9)
	Mean..	24.547	−1.628	−0.228	(1.9)	Mean..	24.549	+4.95	+1.42	(1.9)
64	Oct.	26.612	−1.384	−0.215	(0.9)	Oct.	26.614	−0.30	+0.87	(0.9)
65	Oct.	27.521	−1.775	−0.154	(0.6)	Oct.	27.523	+6.05	+1.42	(0.6)
67		.584	−1.554	0.177	(0.6)		.587	+1.19	+1.91	(0.6)
66		.526	−1.768	−0.29	(0.5)		.528	+5.67	[−0.2]	...
	Mean..	27.545	−1.695	−0.202	(1.7)	Mean..	27.555	+3.62	+1.66	(1.2)
68	Oct.	29.519	−1.818	−0.208	(0.8)	Oct.	29.521	+5.62	+1.66	(0.8)
69		.552	−1.717	0.268	(0.8)		.553	+2.93	1.35	(0.8)
71		.928	+1.701	0.244	(0.8)		.931	+2.88	0.78	(0.8)
72		.961	+1.815	0.263	(0.8)		.963	+5.46	0.94	(0.8)
73		.971	+1.836	−0.234	(0.8)		.973	+6.32	+1.00	(0.8)
	Mean..	29.786	+0.363	−0.243	(4.0)	Mean..	29.788	+4.64	+1.15	(4.0)
74	Oct.	30.558	−1.699	−0.246	(0.9)	Oct.	30.561	+2.12	+0.67	(0.9)
76		.592	−1.493	0.265	(0.9)		.595	+1.71	0.77	(0.9)
75		.564	−1.666	−0.252	(0.7)		.566	−0.33	+1.24	(0.7)
	Mean..	30.572	−1.616	−0.254	(2.5)	Mean..	30.575	+1.12	+0.86	(2.5)
77	Nov.	4.524	−1.866	−0.359		Nov.	4.527	+3.19	+0.89	
78		.560	−1.668	0.294	(2.2)		.564	+0.29	0.93	(2.2)
79		.581	−1.512	−0.339			.585	−1.20	+0.70	
	Mean..	4.555	−1.682	−0.331	(2.2)	Mean..	4.559	+0.76	+0.84	(2.2)

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Parallax and Ephemeris Residuals with Weighted Means, by Dates—Continued.

No.	α					δ				
	Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	s	s		1900	d	"	"	
80	Nov.	5.490	−1.979	−0.319	(0.9)	Nov.	5.494	+ 5.69	[+1.97]	...
81		.502	−1.951	.237	(0.8)		.498	+ 5.32	[2.01]	...
82		.576	−1.533	.252	(0.8)		.579	− 1.16	1.24	(0.9)
83		.935	+1.981	.261	(0.8)		.938	+ 5.95	1.01	(0.8)
84		.942	+1.994	.316	(0.9)		.940	+ 6.15	0.65	(0.9)
85		.968	+2.012	−0.268	(0.9)		.971	+ 8.92	+0.71	(0.9)
	Mean..	5.739	+0.122	−0.277	(5.1)	Mean..	5.855	+ 4.94	+0.90	(3.5)
86	Nov.	6.496	−1.976	−0.316	(1.5)	Nov.	6.498	+ 5.01	[+0.18]	...
87		.566	−1.598	−0.341			.569	− 0.73	[+1.58]	
	Mean..	6.531	−1.787	−0.328	(1.5)	Mean..	.....	....	....	...
90	Nov.	7.487	−2.007	−0.369	(0.9)	Nov.	7.490	+ 5.38	+0.57	(0.9)
91		.585	−1.417	−0.289	(0.9)		.588	− 2.30	+0.77	(0.9)
	Mean..	7.536	−1.712	−0.329	(1.8)	Mean..	7.539	+ 1.54	+0.67	(1.8)
93	Nov.	9.514	−1.908	−0.297	(0.8)	Nov.	9.517	+ 2.36	+1.16	(0.8)
94		.564	−1.558	0.321	(0.8)		.567	− 1.50	1.29	(0.8)
95		.958	+2.081	−0.291	(0.9)		.961	+ 9.85	+0.25	(0.9)
	Mean..	9.690	−0.360	−0.303	(2.5)	Mean..	9.693	+ 3.82	+0.87	(2.5)
96	Nov.	10.494	−1.995	−0.341	(0.7)	Nov.	10.496	+ 3.79	+0.20	(0.7)
98		.579	−1.388	0.284	(0.7)		.582	− 2.75	0.45	(0.7)
99		.586	−1.313	−0.253	(0.7)		.584	− 2.89	+0.75	(0.7)
	Mean..	10.553	−1.565	−0.293	(2.1)	Mean..	10.554	− 0.62	+0.47	(2.1)
100	Nov.	12.492	−1.993	−0.333	(0.8)	Nov.	12.495	+ 3.27	+0.34	(0.8)
101		.505	−1.927	0.267	(0.9)		.502	+ 2.64	0.89	(0.9)
102		.581	−1.301	0.357	(0.9)		.584	− 3.40	1.14	(0.9)
103		.946	+2.124	[−0.205]	...		.949	+10.15	+0.53	(0.9)
	Mean..	12.527	−1.731	−0.318	(2.6)	Mean..	12.636	+ 3.16	+0.74	(3.5)
105	Nov.	13.483	−2.029	−0.362	(0.8)	Nov.	13.486	+ 3.78	+0.76	(0.8)
106		.488	−2.006	0.325	(0.5)		.490	+ 3.36	0.03	(0.5)
107		.496	−1.965	0.388	(0.5)		.498	+ 2.64	0.57	(0.5)
108		.553	−1.559	0.327	(0.5)		.555	− 1.80	0.02	(0.5)
109		.935	+2.141	−0.274	(1.0)		.938	+ 9.58	+0.53	(1.0)
	Mean..	13.633	−0.681	−0.328	(3.3)	Mean..	13.636	+ 4.46	+0.44	(3.3)
110	Nov.	14.492	−1.974	−0.351	(0.9)	Nov.	14.495	+ 2.59	−0.13	(0.9)
111		.501	−1.927	−0.26	(0.5)		.503	+ 1.91	+0.8	(0.5)
	Mean..	14.495	−1.957	−0.318	(1.4)	Mean..	14.498	+ 2.35	+0.20	(1.4)
113	Nov.	15.484	−2.008	−0.274	(0.6)	Nov.	15.486	+ 3.12	+0.18	(0.6)
115		.568	−1.325	0.304	(0.6)		.571	− 3.32	0.14	(0.6)
114		.492	−1.964	0.267	(0.8)		.495	+ 2.36	0.30	(0.8)
116		.573	−1.273	0.325	(0.8)		.576	− 3.60	0.62	(0.8)
117		.931	+2.159	[−0.42]	...		.934	+10.11	+0.4	(0.5)
	Mean..	15.530	−1.639	−0.293	(2.8)	Mean..	15.593	+ 1.19	+0.34	(3.3)

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Parallax and Ephemeris Residuals with Weighted Means, by Dates—Continued.

No.	α					δ			
	Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	s	s		1900	d	"	"	
118	Nov.	16.482	−2.006	−0.274	(0.9)	Nov.	16.484	+ 3.02	+0.11	(0.9)
119		.486	−1.984	0.324	(0.8)		.488	+ 2.67	0.24	(0.8)
120		.582	−1.129	−0.321	(0.9)		.585	− 4.30	+0.44	(0.9)
	Mean..	16.518	−1.696	−0.306	(2.6)	Mean..	16.520	+ 0.38	+0.26	(2.6)
121	Nov.	17.480	−2.003	−0.29	(0.5)	Nov.	17.482	+ 2.84	−0.2	(0.5)
122		.560	−1.341	0.286	(0.6)		.562	− 3.25	+0.36	(0.6)
123		.578	−1.139	−0.297	(0.6)		.580	− 4.24	+0.40	(0.6)
	Mean..	17.543	−1.464	−0.291	(1.7)	Mean..	17.545	− 1.81	+0.21	(1.7)
124	Nov.	21.492	−1.843	−0.345	(0.9)	Nov.	21.495	+ 0.72	+0.66	(0.9)
125		.501	−1.771	.324	(0.8)		.504	− 0.03	0.83	(0.8)
126		.583	−0.904	−0.351	(0.8)		.585	− 4.98	+0.06	(0.8)
	Mean..	21.524	−1.519	−0.340	(2.5)	Mean..	21.527	− 1.34	+0.52	(2.5)
127	Nov.	22.487	−1.855	−0.350		Nov.	22.488	+ 0.99	−0.13	
128		.491	−1.826	0.308	(3.4)		.493	+ 0.63	+0.03	(3.4)
129		.552	−1.227	0.338			.555	− 3.65	−0.39	
130		.581	−0.876	−0.364			.584	− 5.00	−0.25	
	Mean..	22.528	−1.446	−0.340	(3.4)	Mean..	22.530	− 1.76	−0.18	(3.4)
131	Nov.	27.491	−1.672	−0.300	(0.5)	Nov.	27.493	− 0.32	−0.67	(0.5)
132		.499	−1.596	0.281	(0.5)		.501	− 0.93	−0.92	(0.5)
133		.571	−0.783	0.319	(0.5)		.574	− 4.86	−0.51	(0.5)
134		.576	−0.710	0.232	(0.6)		.579	− 5.05	+0.19	(0.6)
135		.914	+2.134	−0.262	(0.8)		....	....	....	...
	Mean..	27.640	−0.257	−0.275	(2.9)	Mean..	27.539	− 2.90	−0.45	(2.1)
136	Nov.	30.482	−1.660	−0.22	(0.4)	Nov.	30.484	− 0.03	−0.1	(0.4)
138		.580	−0.529	0.21	(0.4)		.583	− 5.08	0.2	(0.4)
137		.487	−1.613	0.256	(0.8)		.489	− 0.43	0.46	(0.8)
139		.588	−0.427	0.278	(0.8)		.586	− 5.13	0.76	(0.8)
140		.874	+2.173	0.319	(0.8)		.877	+11.44	0.52	(0.8)
141		.886	+2.161	−0.300	(0.8)		.883	+12.05	−0.94	(0.8)
	Mean..	30.673	+0.240	−0.274	(4.0)	Mean..	30.674	+ 3.08	−0.57	(4.0)
142	Dec.	1.478	−1.658	−0.213	(0.8)	Dec.	1.481	+ 0.11	−0.78	(0.8)
143		.486	−1.589	0.227	(0.8)		.484	− 0.12	0.84	(0.8)
144		.541	−0.993	0.248	(0.8)		.543	− 3.72	0.62	(0.8)
145		.552	−0.853	0.225	(0.8)		.550	− 3.98	0.71	(0.8)
146		.875	+2.164	0.290	(0.9)		.879	+11.98	0.78	(0.9)
147		.884	+2.153	−0.288	(0.9)		.881	+12.26	−0.11	(0.9)
	Mean..	1.646	−0.038	−0.250	(5.0)	Mean..	1.646	+ 3.13	−0.63	(5.0)
148	Dec.	2.473	−1.669	−0.326	(0.6)	Dec.	2.476	+ 0.39	−0.63	(0.6)
150		.490	−1.517	0.329	(0.6)		.487	− 0.50	0.49	(0.6)
149		.483	−1.585	0.270	(0.6)		.485	− 0.32	0.16	(0.6)
151		.888	+2.133	−0.328	(0.8)		.885	+13.06	−0.87	(0.8)
	Mean..	2.607	−0.445	−0.314	(2.6)	Mean..	2.606	+ 3.92	−0.56	(2.6)

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Parallax and Ephemeris Residuals with Weighted Means, by Dates—Continued.

No.	α					δ				
	Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	s	s		1900	d	"	"	
152	Dec.	8.524	−0.937	−0.274	(0.8)	Dec.	8.526	− 2.81	−0.59	(0.8)
153		.532	−0.842	0.208	(0.8)		.529	− 2.94	0.35	(0.8)
154		.558	−0.509	0.207	(0.8)		.561	− 3.93	0.38	(0.8)
155		.848	+2.111	−0.278	(0.9)		.846	+11.45	−0.27	(0.9)
	Mean..	8.623	+0.021	−0.243	(3.3)	Mean..	8.622	+ 0.78	−0.39	(3.3)
156	Dec.	10.487	−1.287	−0.262	(0.8)	Dec.	10.485	− 0.57	−0.93	(0.8)
157		.490	−1.260	0.320	(0.8)		.492	− 1.00	0.64	(0.8)
158		.497	−1.183	0.270	(0.8)		.494	− 1.13	0.04	(0.8)
159		.543	−0.642	0.274	(0.8)		.540	− 3.18	0.17	(0.8)
160		.838	+2.090	0.26	(0.4)		.835	+11.07	0.2	(0.4)
161		.841	+2.091	−0.27	(0.4)		.844	+11.93	−0.5	(0.4)
	Mean..	10.571	−0.456	−0.278	(4.0)	Mean..	10.570	+ 1.12	−0.43	(4.0)
162	Dec.	11.475	−1.385	−0.300	(0.6)	Dec.	11.472	+ 0.24	−0.31	(0.6)
163		.477	−1.362	0.314	(0.6)		.479	− 0.20	0.47	(0.6)
164		.485	−1.279	0.290	(0.6)		.483	− 0.43	0.53	(0.6)
165		.553	−0.485	0.245	(0.6)		.555	− 3.45	0.61	(0.6)
166		.869	+2.045	−0.343	(0.8)		.867	+14.40	−1.12	(0.8)
	Mean..	11.590	−0.335	−0.301	(3.2)	Mean..	11.590	+ 2.88	−0.64	(3.2)
168	Dec.	12.468	−1.423	−0.329	(0.9)	Dec.	12.465	+ 0.73	−0.65	(0.9)
169		.471	−1.389	0.255	(0.9)		.473	+ 0.19	0.45	(0.9)
170		.548	−0.518	0.315	(0.6)		.547	− 3.10	0.40	(0.6)
171		.551	−0.473	−0.304	(0.6)		.553	− 3.28	−0.56	(0.6)
	Mean..	12.501	−1.042	−0.299	(3.0)	Mean..	12.501	− 1.00	−0.52	(3.0)
172	Dec.	13.480	−1.276	−0.27	(0.4)	Dec.	13.477	− 0.03	−0.5	(0.4)
174		.491	−1.156	0.30	(0.4)		.489	− 0.69	0.7	(0.4)
178		.829	+2.057	−0.267	(0.8)		.832	+11.74	−0.65	(0.8)
	Mean..	13.657	+0.420	−0.276	(1.6)	Mean..	13.658	+ 5.69	−0.62	(1.6)
180	Dec.	14.471	−1.330	−0.211	(0.9)	Dec.	14.468	+ 0.62	−0.64	(0.9)
181		.477	−1.272	0.314	(0.5)		.480	− 0.13	1.45	(0.5)
182		.551	−0.421	0.301	(0.5)		.547	− 2.87	0.68	(0.5)
183		.553	−0.388	0.276	(0.9)		.556	− 3.04	0.62	(0.9)
184		.828	+2.047	0.316	(0.9)		.826	+11.44	1.05	(0.9)
185		.832	+2.047	−0.264	(0.9)		.835	+12.36	−1.43	(0.9)
	Mean..	14.637	+0.281	−0.276	(4.6)	Mean..	14.637	+ 3.86	−0.96	(4.6)
186	Dec.	15.463	−1.388	−0.296		Dec.	15.460	+ 1.14	−0.74	
187		.470	−1.319	0.253	(2.6)		.472	+ 0.40	0.94	(2.6)
188		.558	−0.305	−0.244			.555	− 2.87	−0.98	
	Mean..	15.497	−1.004	−0.264	(2.6)	Mean..	15.496	− 0.44	−0.89	(2.6)
190	Dec.	16.473	−1.265	−0.258	(0.9)	Dec.	16.469	+ 0.66	−1.02	(0.9)
193		.567	−0.155	0.318	(0.7)		.570	− 2.86	0.41	(0.7)
194		.855	+1.997	−0.291	(0.8)		.854	+14.70	−0.55	(0.8)
	Mean..	16.628	+0.146	−0.286	(2.4)	Mean..	16.627	+ 4.31	−0.69	(2.4)

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Parallax and Ephemeris Residuals with Weighted Means, by Dates—Continued.

No.	α					δ				
	Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	s	s		1900	d	″	″	
195	Dec.	18.486	−1.076	−0.232	(0.9)	Dec.	18.483	+ 0.01	−0.77	(0.9)
196		.491	−1.025	0.288	(0.8)		.493	− 0.52	0.26	(0.8)
197		.498	−0.946	0.241	(0.6)		.496	− 0.64	0.57	(0.6)
198		.580	+0.053	−0.221	(0.6)		.582	− 2.48	−0.96	(0.6)
	Mean..	18.509	−0.801	−0.247	(2.9)	Mean..	18.509	− 0.79	−0.63	(2.9)
199	Dec.	19.472	−1.196	−0.253		Dec.	19.469	+ 0.85	−0.24	
200		.477	−1.140	0.266	(2.4)		.480	+ 0.26	0.20	(2.4)
201		.548	−0.324	0.253			.546	− 2.06	0.34	
202		.552	−0.273	−0.270			.554	− 2.18	−0.40	
	Mean..	19.512	−0.733	−0.260	(2.4)	Mean..	19.512	− 0.78	−0.30	(2.4)
203	Dec.	20.481	−1.075	−0.288	(0.9)	Dec.	20.477	+ 0.48	−0.63	(0.9)
210	Dec.	24.470	−1.102	−0.236	(1.6)	Dec.	24.469	+ 1.35	−0.58	(1.6)
211		.473	−1.072	−0.286			.475	+ 1.05	−0.66	
	Mean..	24.472	−1.087	−0.261	(1.6)	Mean..	24.472	+ 1.20	−0.62	(1.6)
212	Dec.	29.484	−0.863	−0.202	(0.7)	Dec.	29.481	+ 1.44	[−1.43]	...
	1901					1901				
217	Jan.	2.551	−0.061	[−0.308]	...	Jan.	2.548	+ 0.63	−0.50	(0.5)
218	Jan.	3.484	−0.784	−0.236	(0.9)	Jan.	3.478	+ 2.30	−1.01	(0.9)
219		.489	−0.735	0.148	(0.8)		.492	+ 1.82	0.37	(0.8)
220		.497	−0.642	0.173	(0.4)		.495	+ 1.72	0.84	(0.4)
221		.554	−0.015	−0.163	(0.4)		.557	+ 0.82	−0.60	(0.4)
	Mean..	3.489	−0.623	−0.186	(2.5)	Mean..	3.498	+ 1.82	−0.71	(2.5)
222	Jan.	4.481	−0.802	−0.199		Jan.	4.479	+ 2.45	−0.84	
223		.483	−0.778	0.210	(3.1)		.485	+ 2.21	0.96	(3.1)
224		.522	−0.364	0.180			.520	+ 1.32	0.95	
225		.524	−0.338	−0.189			.526	+ 1.23	−1.14	
	Mean..	4.502	−0.570	−0.194	(3.1)	Mean..	4.502	+ 1.80	−0.97	(3.1)
226	Jan.	5.481	−0.788	−0.214	(0.8)	Jan.	5.478	+ 2.62	−0.93	(0.8)
227		.484	−0.752	0.204	(0.8)		.486	+ 2.33	0.91	(0.8)
228		.530	−0.260	0.202	(0.8)		.528	+ 1.39	1.33	(0.8)
229		.532	−0.238	0.157	(0.8)		.534	+ 1.32	0.91	(0.8)
230		.783	+1.769	0.217	(0.8)		.779	+12.12	1.34	(0.8)
231		.786	+1.774	−0.206	(0.8)		.789	+12.87	−0.91	(0.8)
	Mean..	5.599	+0.251	−0.200	(4.8)	Mean..	5.599	+ 5.44	−1.06	(4.8)
232	Jan.	8.517	−0.377	−0.163	(1.7)	Jan.	8.514	+ 2.18	−1.20	(1.7)
233		.520	−0.342	−0.172			.522	+ 2.05	−1.54	
	Mean..	8.518	−0.360	−0.168	(1.7)	Mean..	8.518	+ 2.12	−1.37	(1.7)

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Weighted Means of Parallax and Ephemeris Residuals, by Groups.

α					δ				
Berlin Mean Time.		Parallax.	O–C	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
1900	d	s	s		1900	d	"	"	
Oct.	9.742	−0.353	−0.090	(4.2)	Oct.	9.683	+4.69	+1.23	(3.9)
	10.743	−0.258	0.101	(3.9)		10.746	+3.59	1.22	(3.9)
	11.946	+1.054	−0.100	(1.2)		11.801	+2.29	+1.32	(2.1)
Mean..	10.446	−0.132	−0.096	(9.3)	Mean..	10.551	+3.75	+1.25	(9.9)
Oct.	15.699	−0.493	−0.119	(6.1)	Oct.	15.702	+4.53	+1.55	(6.1)
	16.847	+0.048	0.146	(2.6)		16.778	+3.94	1.45	(3.4)
	17.934	+1.222	0.161	(0.9)		17.938	+0.87	1.28	(0.9)
	18.748	−0.049	0.134	(3.9)		18.751	+4.48	1.26	(3.9)
	19.956	+1.404	0.146	(2.6)		19.958	+2.44	1.01	(2.6)
	20.652	−0.860	0.160	(3.6)		20.699	+3.66	1.59	(4.2)
	21.552	−1.580	0.158	(2.4)		21.554	+5.44	1.60	(2.4)
	22.536	−1.632	−0.161	(1.3)		22.538	+6.28	+1.76	(1.3)
Mean..	18.636	−0.313	−0.142	(23.4)	Mean..	18.627	+4.12	+1.45	(24.8)
			+0.001 = ρ					+0.01 = ρ	
Oct.	24.547	−1.628	−0.228	(1.9)	Oct.	24.549	+4.95	+1.42	(1.9)
	26.612	−1.384	0.215	(0.9)		26.614	−0.30	0.87	(0.9)
	27.545	−1.695	0.202	(1.7)		27.555	+3.62	1.66	(1.2)
	29.786	+0.363	0.243	(4.0)		29.788	+4.64	1.15	(4.0)
	30.572	−1.616	−0.254	(2.5)		30.575	+1.12	+0.86	(2.5)
Mean..	28.454	−0.892	−0.234	(11.0)	Mean..	28.500	+3.32	+1.17	(10.5)
Nov.	4.555	−1.682	−0.331	(2.2)	Nov.	4.559	+0.76	+0.84	(2.2)
	5.739	+0.122	0.277	(5.1)		5.855	+4.94	0.90	(3.5)
	6.531	−1.787	0.328	(1.5)		....	....	....	...
	7.536	−1.712	−0.329	(1.8)		7.539	+1.54	+0.67	(1.8)
Mean..	5.910	−0.834	−0.304	(10.6)	Mean..	5.879	+2.90	+0.83	(7.5)
Nov.	9.690	−0.360	−0.303	(2.5)	Nov.	9.693	+3.82	+0.87	(2.5)
	10.553	−1.565	−0.293	(2.1)		10.554	−0.62	+0.47	(2.1)
Mean..	10.084	−0.910	−0.298	(4.6)	Mean..	10.086	+1.79	+0.69	(4.6)
Nov.	12.527	−1.731	−0.318	(2.6)	Nov.	12.636	+3.16	+0.74	(3.5)
	13.633	−0.681	0.328	(3.3)		13.636	+4.46	0.44	(3.3)
	14.495	−1.957	0.318	(1.4)		14.498	+2.35	0.20	(1.4)
	15.530	−1.639	0.293	(2.8)		15.593	+1.19	0.34	(3.3)
	16.518	−1.696	0.306	(2.6)		16.520	+0.38	0.26	(2.6)
	17.543	−1.464	−0.291	(1.7)		17.545	−1.81	+0.21	(1.7)
Mean..	14.869	−1.457	−0.310	(14.4)	Mean..	14.795	+1.96	+0.41	(15.8)
Nov.	21.524	−1.519	−0.340	(2.5)	Nov.	21.527	−1.34	+0.52	(2.5)
	22.528	−1.446	−0.340	(3.4)		22.530	−1.76	−0.18	(3.4)
Mean..	22.103	−1.477	−0.340	(5.9)	Mean..	22.105	−1.58	+0.11	(5.9)
Nov.	27.640	−0.257	−0.275	(2.9)	Nov.	27.539	−2.90	−0.45	(2.1)
	30.673	+0.240	0.274	(4.0)		30.674	+3.08	0.57	(4.0)
Dec.	1.646	−0.038	0.250	(5.0)	Dec.	1.646	+3.13	0.63	(5.0)
	2.607	−0.445	−0.314	(2.6)		2.606	+3.92	−0.56	(2.6)
Mean..	30.749	−0.078	−0.273	(14.5)	Mean..	30.915	+2.34	−0.57	(13.7)
			+0.001 = ρ					−0.01 = ρ	

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Weighted Means of Parallax and Ephemeris Residuals, by Groups—Continued.

α					δ				
Berlin Mean Time.		Parallax.	O–C.	Weight.	Berlin Mean Time.		Parallax.	O–C	Weight.
1900	d	s	s		1900	d	"	"	
Dec.	8.623	+0.021	−0.243	(3.3)	Dec.	8.622	+0.78	−0.39	(3.3)
	10.571	−0.456	0.278	(4.0)		10.570	+1.12	0.43	(4.0)
	11.590	−0.335	0.301	(3.2)		11.590	+2.88	0.64	(3.2)
	12.501	−1.042	0.299	(3.0)		12.501	−1.00	0.52	(3.0)
	13.657	+0.420	0.276	(1.6)		13.658	+5.69	0.62	(1.6)
	14.637	+0.281	0.276	(4.6)		14.637	+3.86	0.96	(4.6)
	15.497	−1.004	0.264	(2.6)		15.496	−0.44	0.89	(2.6)
	16.628	+0.146	−0.286	(2.4)		16.627	+4.31	−0.69	(2.4)
Mean..	12.741	−0.253	−0.278	(24.7)	Mean..	12.741	+1.99	−0.65	(24.7)
			−0.001 = ρ					−0.01 = ρ	
Dec.	18.509	−0.801	−0.247	(2.9)	Dec.	18.509	−0.79	−0.63	(2.9)
	19.512	−0.733	0.260	(2.4)		19.512	−0.78	0.30	(2.4)
	20.481	−1.075	0.288	(0.9)		20.477	+0.48	0.63	(0.9)
	24.472	−1.087	−0.261	(1.6)		24.472	+1.20	−0.62	(1.6)
Mean..	20.268	−0.871	−0.259	(7.8)	Mean..	20.268	−0.23	−0.53	(7.8)
								+0.01 = ρ	
Dec.	29.484	−0.863	−0.202	(0.7)		.....	....	....	...
1901					1901				
	.....	.....	.....	...	Jan.	2.548	+0.63	−0.50	(0.5)
Jan.	3.489	−0.623	−0.186	(2.5)		3.498	+1.82	0.71	(2.5)
	4.502	−0.570	0.194	(3.1)		4.502	+1.80	0.97	(3.1)
	5.599	+0.251	0.200	(4.8)		5.599	+5.44	1.06	(4.8)
	8.518	−0.360	−0.168	(1.7)		8.518	+2.12	−1.37	(1.7)
Mean..	5.294	−0.226	−0.191	(12.1)	Mean..	5.185	+3.19	−0.99	(12.6)

TABLE I.—*Summary of Groups.*

α				δ			
Berlin Mean Time.	Parallax.	O–C	Weight.	Berlin Mean Time.	Parallax.	O–C	Weight.
1900 d	s	s		1900 d	"	"	
Oct. 10.446	−0.130	−0.096	(9.3)	Oct. 10.551	+3.75	+1.25	(9.9)
18.636	−0.313	−0.141	(23.4)	18.627	+4.12	+1.46	(24.8)
28.454	−0.892	−0.234	(11.0)	28.500	+3.32	+1.17	(10.5)
Nov. 5.910	−0.834	−0.304	(10.6)	Nov. 5.879	+2.90	+0.83	(7.5)
10.115	−1.638	−0.300	(3.7)	10.086	+1.79	+0.69	(4.6)
14.869	−1.457	−0.310*	(14.4)	14.795	+1.96	+0.41*	(15.8)
22.103	−1.477	−0.340	(5.9)	22.105	−1.58	+0.11	(5.9)
30.749	−0.078	−0.272	(14.5)	30.915	+2.34	−0.58	(13.7)
Dec. 12.741	−0.253	−0.279	(24.7)	Dec. 12.741	+1.99	−0.66	(24.7)
20.268	−0.871	−0.259	(7.8)	20.268	−0.23	−0.52	(7.8)
29.484	−0.863	−0.202	(0.7)	1901			
1901				Jan. 5.185	+3.19	−0.99	(12.6)
Jan. 5.294	−0.226	−0.191	(12.1)				

* Ephemeris changed from A to B.

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TABLE II.—*Corrections to the Ephemeris.*

α				δ			
Ephemeris A.		Ephemeris B.		Ephemeris A.		Ephemeris B.	
Berlin Mean Time.	Eph. Corr.	Berlin Mean Time.	Eph. Corr.	Berlin Mean Time.	Eph. Corr.	Berlin Mean Time.	Eph. Corr.
1900 d	s	1900 d	s	1900 d	"	1900 d	"
Oct. 8.0	−0.084	Nov. 22.0	−0.341	Oct. 8.0	+1.24	Nov. 22.0	+0.14
11.0	−0.099	25.0	−0.310	11.0	+1.26	25.0	−0.29
14.0	−0.114	28.0	−0.288	14.0	+1.33	28.0	−0.46
17.0	−0.131	Dec. 1.0	−0.276	17.0	+1.39	Dec. 1.0	−0.58
20.0	−0.152	4.0	−0.273	20.0	+1.39	4.0	−0.65
23.0	−0.180	7.0	−0.274	23.0	+1.34	7.0	−0.68
26.0	−0.210	10.0	−0.276	26.0	+1.25	10.0	−0.68
29.0	−0.240	13.0	−0.275	29.0	+1.14	13.0	−0.65
Nov. 1.0	−0.266	16.0	−0.272	Nov. 1.0	+1.02	16.0	−0.59
4.0	−0.286	19.0	−0.264	4.0	+0.90	19.0	−0.54
7.0	−0.300	22.0	−0.255	7.0	+0.79	22.0	−0.53
10.0	−0.307	25.0	−0.243	10.0	+0.67	25.0	−0.57
13.0	−0.310	28.0	−0.230	13.0	+0.52	28.0	−0.65
16.0	−0.310	31.0	−0.216	16.0	+0.31	31.0	−0.76
		1901				1901	
19.0	−0.309	Jan. 3.0	−0.201	19.0	+0.06	Jan. 3.0	−0.88
22.0	−0.305	6.0	−0.186	22.0	−0.16	6.0	−1.03
		9.0	−0.172			9.0	−1.18

A determination of the solar parallax may now be undertaken. The material for this purpose is printed below, as much depends upon the selection of this matter, and it is important to know which observations were used and which rejected. The number of the observation, date, parallax, and ephemeris residual (O–C), together with the weight of the observed place of the asteroid, are given for each observation. A brace is placed after those residuals which depend upon a single comparison star.

The solar parallax was computed by means of the following formula:

$$\pi = 8''.800 - 8''.800 \frac{C_2 - C_1 - s\,(t_2 - t_1)}{P_2 - P_1},$$

where

C_1, C_2 = the means of the ephemeris residuals from the observations, evening and morning, respectively.

P_1, P_2 = the means of the corresponding parallaxes for the observations, evening and morning, respectively.

t_1, t_2 = the means of the times of the observations, evening and morning, respectively.

s = the daily change of the ephemeris correction, = the slope of the smooth curve, the coordinates of which are given in Table II.

No material error is introduced by taking the mean of the parallaxes, since there was never a great range among the individual values of P_1 and P_2.

The formulæ used for computing the weight of a determination of π are as follows:

$$w_\pi = \frac{15^2 \cos^2\delta (P_2 - P_1)^2}{8.80^2} \times \frac{w_1 w_2}{w_1 + w_2}, \text{ for right ascensions,}$$

$$w_\pi = \frac{(P_2 - P_1)^2}{8.80^2} \times \frac{w_1 w_2}{w_1 + w_2}, \text{ for declinations,}$$

where

w_π = the weight of a determination of π.

w_1, w_2 = the weights of the mean ephemeris residuals, for the evening and morning observations, respectively.

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The items for the computation of π are given in Tables III and IV. The quantities given in the column of weights, which follows immediately after that headed (C_2-C_1) in these tables, are the values of $\frac{w_1 w_2}{w_1+w_2}$, and apply to the quantities (C_2-C_1). The probable error of π was computed from the weight by means of the formula

$$r=0.674\frac{0''.26}{\sqrt{w_\pi}}.$$

In several cases the value found for $\Delta\pi$ is out by an unreasonable amount, and it was decided, somewhat arbitrarily, to reject those determinations where the mean of the ephemeris residuals, C_2 and C_1, differ by more than a half second of arc. There are three such cases in right ascension and two in declination. They are marked with an asterisk in the tables.

However, the value of π was deduced in two ways: First, retaining all the determinations of $\Delta\pi$ and, second, rejecting those values which are marked with an asterisk. The latter should be considered the value of π determined from the Washington Observations in their present state. Combining the determination in right ascension with that in declination we obtain

$$\Delta\pi=+0''.008 \qquad \text{Weight}=(199.7)$$

or

$$\pi=8''.808\pm0''.0125$$

Observations used in the Determination of the Solar Parallax from Right Ascensions of Eros.

No.	Berlin Mean Time.	Parallax.	O–C	Weight.	No.	Berlin Mean Time.	Parallax.	O–C	Weight.
	1900 d	s	s			1900 d	s	s	
1	Oct. 9.563	−1.315	−0.097	(0.9)	22	Oct. 15.942	+1.182	−0.135	(0.5)
3	.608	−1.266	0.076	(0.8)	23	.954	+1.250	0.093	(0.8)
4	.614	−1.250	−0.080	(0.9)	24	.969	+1.319	−0.136	(0.8)
	Mean. 9.594	−1.2774	−0.0847	(2.6)		Mean. 15.957	+1.2601	−0.1194	(2.1)
5	Oct. 9.979	+1.121	−0.098	(0.8)	26	Oct. 16.566	−1.476	−0.170	(0.4)
6	.987	+1.176	−0.100	(0.8)	27	.608	−1.365	−0.140	(0.4)
	Mean. 9.983	+1.1485	−0.0990	(1.6)		Mean. 16.587	−1.4205	−0.1550	(0.8)
7	Oct. 10.552	−1.337	−0.077	(0.7)	28	Oct. 16.957	+1.300	−0.138	(0.9)
8	.568	−1.338	0.082	(0.7)	29	.968	+1.352	−0.145	(0.9)
9	.599	−1.300	−0.087	(0.7)		Mean. 16.962	+1.3260	−0.1415	(1.8)
	Mean. 10.573	−1.3250	−0.0820	(2.1)					
10	Oct. 10.930	+0.927	−0.098	(0.6)	35	Oct. 18.514	−1.531	−0.182	(0.9)
11	.940	+0.985	0.121	(0.6)	36	.522	−1.540	0.124	(0.5)
12	.952	+1.050	−0.149	(0.6)	37	.589	−1.454	−0.103	(0.5)
	Mean. 10.941	+0.9873	−0.1227	(1.8)		Mean. 18.536	−1.5131	−0.1459	(1.9)
17	Oct. 15.527	−1.456	−0.134	(0.8)	33	Oct. 17.934	+1.222	−0.161	(0.9)
18	.532	−1.461	0.105	(0.8)	38	18.929	+1.230	0.076	(0.5)
19	.539	−1.465	0.139	(0.8)	39	.939	+1.290	0.123	(0.5)
20	.607	−1.356	0.137	(0.8)	40	.962	+1.404	0.191	(0.5)
21	.615	−1.328	−0.076	(0.8)	41	.972	+1.441	−0.103	(0.5)
	Mean. 15.564	−1.4132	−0.1182	(4.0)		Mean. 18.635	+1.3042	−0.1350	(2.9)

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Observations used in the Determination of the Solar Parallax from Right Ascensions of Eros—Cont'd.

No.	Berlin Mean Time.	Parallax.	O–C	Weight.
	1900 d	s	s	
45	Oct. 19.929	+1.275	−0.121	(0.9)
46	.963	+1.446	0.161	(0.9)
47	.975	+1.491	0.157	(0.9)
52	20.934	+1.348	−0.122	(0.8)
	Mean. 20.179	+1.3912	−0.1408	(3.5)
48	Oct. 20.503	−1.579	−0.173	(0.7)
49	.586	−1.496	0.178	(0.7)
50	.593	−1.469	0.179	(0.7)
51	.605	−1.417	−0.156	(0.7)
	Mean. 20.572	−1.4902	−0.1715	(2.8)
68	Oct. 29.519	−1.818	−0.208	(0.8)
69	.552	−1.717	0.268	(0.8)
74	30.558	−1.699	0.246	(0.9)
76	.592	−1.493	0.265	(0.9)
75	.564	−1.666	−0.252	(0.7)
	Mean. 30.167	−1.6749	−0.2481	(4.1)
71	Oct. 29.928	+1.701	−0.244	(0.8)
72	.961	+1.815	0.263	(0.8)
73	.971	+1.836	−0.234	(0.8)
	Mean. 29.953	+1.7840	−0.2470	(2.4)
80	Nov. 5.490	−1.979	−0.319	(0.9)
81	.502	−1.951	0.237	(0.8)
82	.576	−1.533	0.252	(0.8)
86	6.496	−1.976	0.316	(0.8)
87	.566	−1.598	−0.341	(0.8)
	Mean. 5.915	−1.8116	−0.2936	(4.1)
83	Nov. 5.935	+1.981	−0.261	(0.8)
84	.942	+1.994	0.316	(0.9)
85	.968	+2.012	−0.268	(0.9)
	Mean. 5.949	+1.9962	−0.2825	(2.6)
105	Nov. 13.483	−2.029	−0.362	(0.8)
106	.488	−2.006	0.325	(0.6)
108	.553	−1.559	0.327	(0.6)
110	14.492	−1.974	0.351	(0.9)
111	.501	−1.927	−0.260	(0.5)
	Mean. 13.913	−1.9124	−0.3314	(3.4)
109	Nov. 13.935	+2.141	−0.274	(1.0)
131	Nov. 27.491	−1.672	−0.300	(0.6)
132	.499	−1.596	−0.281	(0.6)
	Mean. 27.495	−1.6340	−0.2905	(1.2)
135	Nov. 27.914	+2.134	−0.262	(0.8)
136	Nov. 30.482	−1.660	−0.220	(0.5)
137	.487	−1.613	−0.256	(0.9)
	Mean. 30.485	−1.6298	−0.2431	(1.4)
140	Nov. 30.874	+2.173	−0.319	(0.8)
141	.886	+2.161	−0.300	(0.8)
	Mean. 30.880	+2.1670	−0.3095	(1.6)
142	Dec. 1.478	−1.658	−0.213	(0.9)
143	.486	−1.589	−0.227	(0.9)
	Mean. 1.482	−1.6235	−0.2200	(1.8)
146	Dec. 1.875	+2.164	−0.290	(0.9)
147	.884	+2.153	−0.288	(0.9)
	Mean. 1.880	+2.1585	−0.2890	(1.8)
148	Dec. 2.473	−1.669	−0.326	(0.6)
150	.490	−1.517	0.329	(0.6)
149	.483	−1.585	−0.270	(0.6)
	Mean. 2.482	−1.5903	−0.3083	(1.8)
151	Dec. 2.888	+2.133	−0.328	(0.8)
152	Dec. 8.524	−0.937	−0.274	(0.8)
155	Dec. 8.848	+2.111	−0.278	(0.9)
156	Dec. 10.487	−1.287	−0.262	(0.8)
157	.490	−1.260	0.320	(0.8)
158	.497	−1.183	−0.270	(0.9)
	Mean. 10.492	−1.2409	−0.2834	(2.5)
160	Dec. 10.838	+2.090	−0.260	(0.4)
161	.841	+2.091	−0.270	(0.4)
	Mean. 10.840	+2.0905	−0.2650	(0.8)
162	Dec. 11.475	−1.385	−0.300	(0.7)
163	.477	−1.362	0.314	(0.7)
164	.485	−1.279	−0.290	(0.7)
	Mean. 11.479	−1.3420	−0.3013	(2.1)
166	Dec. 11.869	+2.045	−0.343	(0.8)
172	Dec. 13.480	−1.276	−0.270	(0.4)
174	.491	−1.156	−0.300	(0.4)
	Mean. 13.485	−1.2160	−0.2850	(0.8)

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Observations used in the Determination of the Solar Parallax from Right Ascensions of Eros—Cont'd.

No.	Berlin Mean Time.	Parallax.	O–C	Weight.	No.	Berlin Mean Time.	Parallax.	O–C	Weight.
	1900 d	s	s			1900 d	s	s	
178	Dec. 13.829	+2.057	−0.267	(0.8)	190	Dec. 16.473	−1.265	−0.258	(0.9)
					194	Dec. 16.855	+1.997	−0.291	(0.8)
180	Dec. 14.471	−1.330	−0.211	(0.9)		1901			
181	.477	−1.272	0.314	(0.7)					
186	15.463	−1.388	0.296	(0.9)	226	Jan. 5.481	−0.788	−0.214	(0.8)
187	.470	−1.319	−0.253	(0.9)	227	.484	−0.752	−0.204	(0.8)
	Mean. 14.999	−1.3305	−0.2658	(3.4)		Mean. 5.482	−0.7700	−0.2090	(1.6)
184	Dec. 14.828	+2.047	−0.316	(0.9)	230	Jan. 5.783	+1.769	−0.217	(0.8)
185	.832	+2.047	−0.264	(0.9)	231	.786	+1.774	−0.206	(0.8)
	Mean. 14.830	+2.0470	−0.2900	(1.8)		Mean. 5.785	+1.7715	−0.2115	(1.6)

TABLE III.—*Determination of the Solar Parallax from Right Ascensions of Eros.*

Berlin Mean Time.	P_2-P_1	C_2-C_1	Weight.	t_2-t_1	s	$\Delta\pi$	Weight.
1900 d	s	s		d	s	"	
Oct. 9.8	+2.426	−0.0143	(1.0)	+0.39	−0.0050	+0.045	(7.6)
10.8	+2.312	−0.0407	(1.0)	+0.37	−0.0052	+0.148	(6.9)
15.8	+2.673	−0.0012	(1.4)	+0.39	−0.0059	−0.004	(12.1)
16.8	+2.746	+0.0135	(0.6)	+0.37	−0.0062	−0.051	(5.4)
18.6	+2.817	+0.0109	(1.1)	+0.10	−0.0074	−0.036	(10.2)
20.4	+2.881	+0.0307	(1.6)	−0.39	−0.0084	−0.084	(14.9)
30.1	+3.459	+0.0011	(1.5)	−0.21	−0.0093	+0.002	(18.3)
Nov. 5.9	+3.808	+0.0111	(1.6)	+0.03	−0.0045	−0.026	(23.2)
13.9	+4.053	+0.0574*	(0.8)	+0.02	0.0000	−0.125*	(13.1)
27.7	+3.768	+0.0285	(0.5)	+0.42	+0.0060	−0.061	(8.0)
30.7	+3.797	−0.0664*	(0.7)	+0.40	+0.0029	+0.156*	(11.8)
Dec. 1.7	+3.782	−0.0690*	(0.9)	+0.40	+0.0020	+0.162*	(15.3)
2.7	+3.723	−0.0197	(0.6)	+0.41	+0.0006	+0.047	(10.1)
8.7	+3.048	−0.0040	(0.4)	+0.32	−0.0005	+0.011	(4.8)
10.7	+3.331	+0.0184	(0.7)	+0.35	−0.0003	−0.049	(10.4)
11.7	+3.387	−0.0417	(0.6)	+0.39	+0.0002	+0.108	(9.5)
13.7	+3.273	+0.0180	(0.4)	+0.34	+0.0011	−0.047	(6.0)
14.9	+3.378	−0.0242	(1.2)	−0.17	+0.0014	+0.062	(19.8)
16.7	+3.262	−0.0330	(0.4)	+0.38	+0.0019	+0.091	(6.2)
1901							
Jan. 5.6	+2.542	−0.0025	(0.8)	+0.30	+0.0050	+0.014	(9.8)

Retaining all determinations,

Mean $\Delta\pi = +0''.017$ Weight = (223.4)

$\pi = 8''.817 \pm 0''.0116$, r deduced from weight,

$\pm 0''.0127$, r from intercomparison of $\Delta\pi$'s.

Rejecting those determinations where C_2-C_1 is greater than $0^s.05$, marked by asterisks,

Mean $\Delta\pi = +0''.006$ Weight = (183.2)

$\pi = 8''.806 \pm 0''.0129$, r deduced from weight,

$\pm 0''.0102$, r from intercomparison of $\Delta\pi$'s.

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Observations used in the Determination of the Solar Parallax from Declinations of Eros.

No.	Berlin Mean Time.		Parallax.	O–C	Weight.	No.	Berlin Mean Time.		Parallax.	O–C	Weight.
	1900	d	"	"			1900	d	"	"	
102	Nov.	12.584	− 3.40	+1.14	(0.9)	155	Dec.	8.846	+11.45	−0.27	(0.9)
103	Nov.	12.949	+10.15	+0.53	(0.9)	156	Dec.	10.485	− 0.57	−0.93	(0.8)
						157		.492	− 1.00	0.64	(0.8)
						158		.494	− 1.13	0.04	(0.8)
115	Nov.	15.571	− 3.32	+0.14	(0.8)	159		.540	− 3.18	−0.17	(0.8)
116		.576	− 3.60	+0.62	(0.9)						
	Mean.	15.574	− 3.47	+0.39	(1.7)		Mean.	10.503	− 1.47	−0.445	(3.2)
117	Nov.	15.934	+10.11	+0.40	(0.5)	160	Dec.	10.835	+11.07	−0.20	(0.4)
						161		.844	+11.93	−0.50	(0.4)
							Mean.	10.840	+11.50	−0.350	(0.8)
138	Nov.	30.583	− 5.08	−0.20	(0.5)						
139		.586	− 5.13	−0.76	(0.9)						
						165	Dec.	11.555	− 3.45	−0.61	(0.9)
	Mean.	30.585	− 5.11	−0.560	(1.4)	166	Dec.	11.867	+14.40	−1.12	(0.8)
140	Nov.	30.877	+11.44	−0.52	(0.8)						
141		.883	+12.05	−0.94	(0.8)	172	Dec.	13.477	− 0.03	−0.50	(0.4)
						174		.489	− 0.69	−0.70	(0.4)
	Mean.	30.880	+11.745	−0.730	(1.6)		Mean.	13.483	− 0.36	−0.600	(0.8)
144	Dec.	1.543	− 3.72	−0.62	(0.9)						
145		.550	− 3.98	−0.71	(0.9)	178	Dec.	13.832	+11.74	−0.65	(0.8)
	Mean.	1.546	− 3.850	−0.665	(1.8)						
						182	Dec.	14.547	− 2.87	−0.68	(0.7)
						183		.556	− 3.04	−0.62	(0.9)
146	Dec.	1.879	+11.98	−0.78	(0.9)		Mean.	14.552	− 2.966	−0.646	(1.6)
147		.881	+12.26	−0.11	(0.9)						
	Mean.	1.880	+12.120	−0.445	(1.8)	184	Dec.	14.826	+11.44	−1.05	(1.0)
148	Dec.	2.476	+ 0.39	−0.63	(0.6)	193	Dec.	16.570	− 2.86	−0.41	(0.7)
150		.487	− 0.50	0.49	(0.6)						
149		.485	− 0.32	−0.16	(0.6)	194	Dec.	16.854	+14.70	−0.55	(0.8)
	Mean.	2.483	− 0.143	−0.427	(1.8)		1901				
						228	Jan.	5.528	+ 1.39	−1.33	(0.9)
						229		.534	+ 1.32	−0.91	(0.8)
151	Dec.	2.885	+13.06	−0.87	(0.8)		Mean.	5.531	+ 1.357	−1.132	(1.7)
152	Dec.	8.526	− 2.81	−0.59	(0.8)						
153		.529	− 2.94	0.35	(0.8)	230	Jan.	5.779	+12.12	−1.34	(0.8)
154		.561	− 3.93	−0.38	(0.8)	231		.789	+12.87	−0.91	(0.8)
	Mean.	8.539	− 3.227	−0.440	(2.4)		Mean.	5.784	+12.495	−1.125	(1.6)

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TABLE IV.—*Determination of the Solar Parallax from Declinations of Eros.*

Berlin Mean Time.	P_2-P_1	C_2-C_1	Weight.	t_2-t_1	s	$\Delta\pi$	Weight.
1900 d	″	″		d	″	″	
Nov. 12.8	+13.55	−0.610*	(0.4)	+0.36	−0.054	+0.383*	(0.9)
15.8	+13.58	+0.010	(0.4)	+0.36	−0.074	−0.024	(0.9)
30.7	+16.85	−0.170	(0.7)	+0.30	−0.029	+0.084	(2.6)
Dec. 1.7	+15.97	+0.220	(0.9)	+0.33	−0.028	−0.126	(3.0)
2.7	+13.20	−0.443	(0.6)	+0.40	−0.023	+0.289	(1.4)
8.7	+14.68	+0.170	(0.7)	+0.31	0.000	−0.102	(2.0)
10.7	+12.97	+0.095	(0.6)	+0.34	+0.008	−0.062	(1.3)
11.7	+17.85	−0.510*	(0.4)	+0.31	+0.012	+0.253*	(1.6)
13.7	+12.10	−0.050	(0.4)	+0.35	+0.020	+0.041	(0.8)
14.7	+14.41	−0.404	(0.6)	+0.27	+0.020	+0.250	(1.6)
16.7	+17.56	−0.140	(0.4)	+0.28	+0.017	+0.072	(1.6)
1901							
Jan. 5.7	+11.14	+0.007	(0.8)	+0.25	−0.048	−0.015	(1.3)

Retaining all determinations,

Mean $\Delta\pi = +0''.064$ Weight = (19.0)

$\pi = 8''.864 \pm 0''.0401$, r deduced from weight,

$\pm 0''.0321$, r from intercomparison of $\Delta\pi$'s.

Rejecting those determinations where C_2-C_1 is greater than $0''.5$, marked by asterisks,

Mean $\Delta\pi = +0''.029$ Weight = (16.5)

$\pi = 8''.829 \pm 0''.0431$, r deduced from weight,

$\pm 0''.0306$, r from intercomparison of $\Delta\pi$'s.

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ORBITS OF ASTEROIDS.

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ELEMENTS OF (245) VERA.

By ELEANOR A. LAMSON.

The asteroid Taunton No. 26 was discovered by METCALF at Taunton, Mass., on January 4, 1907. From observations made at Washington the following elements were computed, showing the asteroid to be identical with (245) Vera. The method used is that given by Dr. W. EBERT in his Eine einfache Methode zur Bestimmung elliptischer Bahnen aus drei Beobachtungen (Denkschr. d. kais. Akad. d. Wissensch., mathem.-naturw. Kl., Bd. LXXVIII).

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ′ ″			s	″
Jan. 26	11 16 38	8 38 53.13	+25 34 4.4	9.125_n	0.323	+0.81	+1.4
Feb. 11	9 10 32	8 25 3.60	+26 21 36.0	9.374_n	0.348	+0.65	+2.0
27	8 28 57	8 14 55.03	+26 39 53.2	9.238_n	0.305	+0.52	+2.2

Elements.

Epoch: 1907, February 27.5, Berlin Mean Time.

	° ′ ″	
M =	78 42 4.7	
ω =	325 7 19.3	1907.0
Ω =	62 15 47.7	1907.0
i =	5 12 38.9	1907.0
φ =	12 45 20.8	

$\mu = 650''.067$

$\log a = 0.491366$

The residuals (O–C) for the middle place are $\cos\beta\Delta\lambda = 0''.5$, and $\Delta\beta = +0''.1$.

Heliocentric Coordinates 1907.0

	° ′ ″	
$x = r$ [9.998592] sin	(117 17 14.8	$+v$)
$y = r$ [9.954426] sin	(29 31 15.4	$+v$)
$z = r$ [9.645881] sin	(17 52 48.4	$+v$)

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Ephemeris for 1907.

Berlin Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1907	h m s	° ′ ″	
Jan. 26.5	8 39 4.6	+25 33 18	0.315313
30.5	8 35 26.1	25 47 52	0.317633
Feb. 3.5	8 31 51.6	26 0 48	0.320927
7.5	8 28 24.8	26 12 2	0.325156
11.5	8 25 9.1	26 21 23	0.330264
15.5	8 22 8.1	26 28 50	0.336202
19.5	8 19 24.3	26 34 22	0.342888
23.5	8 17 0.2	26 38 2	0.350231
27.5	8 14 57.4	+26 39 54	0.358148

The observations at Washington give the following corrections to this ephemeris:

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1907	s	″	1907	s	″
Jan. 26	0.0	−1	Feb. 15	+0.1	0
27	−0.2	−2	18	−0.2	−1
Feb. 6	+0.1	0	20	−0.1	0
8	+0.2	−1	25	0.0	−1
11	+0.1	−1	27	+0.1	−1
12	0.0	0			

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ELEMENTS OF (260) HUBERTA=[1906 WO].

By MATT FREDERICKSON.

The asteroid [1906 WO] was discovered by METCALF at Taunton, Mass., on November 12, 1906. From three observations made at Washington the following elements were computed, showing the asteroid to be identical with (260) Huberta. The method used is that given by WATSON in his Theoretical Astronomy.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
Nov. 21	11 53 22	3 41 45.28	+11 7 15.6	8.412	0.610	−1.96	−1.9
Dec. 7	8 16 20	3 30 33.05	+10 31 19.4	9.399_n	0.639	−2.12	−3.3
23	7 53 41	3 22 27.99	+10 19 6.5	9.202_n	0.629	−2.29	−4.3

Elements.

Epoch: 1906, November 21.5, Berlin Mean Time.

M =	70 43 48.6	
ω =	163 43 56.5	1906.0
Ω =	168 2 37.8	1906.0
i =	6 17 54.4	1906.0
φ =	7 16 7.2	

$\mu = 557''.026$

$\log a = 0.536092$

Heliocentric Coordinates 1906.0

$x = r\,[9.999888] \sin(61\ 50\ 46.7 + v)$

$y = r\,[9.979933] \sin(332\ 15\ 5.9 + v)$

$z = r\,[9.474183] \sin(327\ 40\ 12.0 + v)$

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Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1906	h m s	° ′ ″		m s
Nov. 21	3 41 55.81	+11 7 58.3	0.373872	19 38
25	3 38 55.73	10 56 56.5	0.375876	19 44
29	3 36 0.69	10 47 5.8	0.378728	19 52
Dec. 3	3 33 3.24	10 38 34.4	0.382399	20 2
7	3 30 35.96	10 31 29.6	0.386841	20 14
11	3 28 11.03	10 25 56.6	0.392008	20 29
15	3 26 0.48	10 22 0.4	0.397840	20 46
19	3 24 6.12	10 19 44.2	0.404271	21 5
23	3 22 29.30	10 19 8.7	0.411224	21 25
27	3 21 10.94	+10 20 13.3	0.418625	21 46

The observations at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1906	s	″	1906	s	″
Nov. 21	+0.06	+1.7	Dec. 4	+0.23	+0.7
22	−0.09	+0.3	7	+0.09	−0.6
23	+0.04	0.0	11	0.00	−1.4
24	+0.08	−1.6	23	+0.03	−0.7
25	−0.02	−0.2			

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ELEMENTS OF (469) ARGENTINA=[1907 XZ].

By ELEANOR A. LAMSON.

The asteroid [1907XZ] was discovered by METCALF at Taunton, Mass., and independently by LIAPIN at Pulkowa on March 18, 1907.

Elements were computed from four observations made at Washington by the method Ermittlung der Bahnelemente ohne bestimmte Voraussetzung über die Excentricität aus vier Beobachtungen, von denen nur die äusseren vollständig dargestellt werden sollen, as given by THEODOR R. v. OPPOLZER, in his Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log pd.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ′ ″			s	″
Mar. 21	10 0 18	11 38 4.09	−5 44 41.7	9.304$_n$	0.784	+0.22	−0.17
Apr. 1	9 55 41	11 28 53.37	−5 29 14.3	9.045$_n$	0.786	+0.17	−0.09
12	7 58 17	11 21 30.97	−5 13 16.5	9.370$_n$	0.779	+0.10	−0.20
24	10 24 50	11 16 22.58	−5 1 54.0	9.177	0.781	+0.03	+0.13

Elements.

Epoch: 1907, April 24.5, Greenwich Mean Time.

$$\left.\begin{array}{rl} M = & 7\ 31\ 46.4 \\ \omega = & 201\ 23\ 58.5 \\ \Omega = & 335\ 11\ 17.5 \\ i = & 11\ 45\ 15.4 \end{array}\right\} 1907.0$$

$$\varphi = 8\ 58\ 51.8$$

$$\mu = 626''.309$$

$$\log a = 0.502146$$

The residuals (O–C) for the middle places are $\cos\beta\Delta\lambda = -0''.1$ and $-0''.4$, $\Delta\beta = +2''.9$ and $-0''.2$.

Heliocentric Coordinates 1907.0

$$x = r\,[9.998407]\ \sin(\ 65\ 38\ 51.1 + v)$$
$$y = r\,[9.918550]\ \sin(332\ 19\ 44.9 + v)$$
$$z = r\,[9.752630]\ \sin(342\ 49\ 52.4 + v)$$

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Ephemeris for 1907.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1907	h m s	° ′ ″	
Mar. 21.5	11 38 10.24	− 5 44 44.4	0.228331
25.5	11 34 41.69	5 39 38.6	0.229468
29.5	11 31 21.34	5 33 53.9	0.231718
Apr. 2.5	11 28 12.72	5 27 50.6	0.235032
6.5	11 25 18.84	5 21 44.6	0.239358
10.5	11 22 42.61	5 15 56.0	0.244616
14.5	11 20 26.49	5 10 42.2	0.250726
18.5	11 18 32.32	5 6 19.8	0.257596
22.5	11 17 1.39	5 3 2.4	0.265123
26.5	11 15 54.38	5 1 2.2	0.273212
May 18.5	11 16 51.33	5 17 53.4	0.323943
20.5	11 17 30.61	− 5 21 59.8	0.328824

The observations at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1907	s	″	1907	s	″
Mar. 21	+0.14	+0.2	Apr. 12	+0.14	−2.2
22	+0.09	−2.3	16	+0.14	−0.9
25	+0.06	−1.5	20	+0.18	−1.5
28	+0.26	−2.2	24	+0.07	−2.8
Apr. 1	+0.15	+0.8	May 18	−0.46	−1.2

The estimated magnitude on April 16 was 11.8.

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ELEMENTS OF (532) HERCULINA.

By J. C. HAMMOND.

This asteroid was discovered by WOLF at Königstuhl on April 20, 1904, and was unusually bright as compared with others discovered recently. Provisional elements were computed by the method given by TISSERAND in his Leçons sur la Détermination des Orbites. Two observations made by Doctor LUTHER at Düsseldorf on April 23 and May 7, and one by HAMMOND at Washington on May 23, were used.

These observations are as follows:

Date.	Place.	Local Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1904.0	
					α	δ	α	δ
1904		h m s	h m s	° ′ ″			s	″
Apr. 23	Düsseldorf....	11 18 43	13 50 27.86	+18 25 10.8	8.636$_n$	0.676	−0.58	+0.5
May 7	Düsseldorf....	10 35 11	13 40 5.05	+17 53 50.9	7.789$_n$	0.681	−0.67	+1.5
23	Washington ..	9 56 31	13 32 45.66	+16 1 28.9	8.777	0.532	−0.82	+2.5

Provisional Elements.

Epoch: 1904, May 8.0, Berlin Mean Time

$M = 18\ 36\ 30.6$

$\pi = 182\ 28\ 38.4$
$\Omega = 108\ 10\ 58.9$ Mean Equinox and Ecliptic 1904.0
$i = 16\ 22\ 37.9$

$\varphi = 10\ 5\ 24.3$

$\mu = 767''.950$

$\log a = 0.443116$

π is the longitude of perihelion counted from the equinox.

Residuals.		Apr. 23.	May 7.	May 23.
		″	″	″
O−C	α	+0.4	+0.4	−0.1
	δ	+0.5	−1.5	−0.2

Heliocentric Coordinates 1904.0

$x = r\,[9.983829] \sin (273\ 11\ 33.8 + v)$
$y = r\,[9.979361] \sin (188\ 13\ 46.4 + v)$
$z = r\,[9.605330] \sin (144\ 2\ 26.1 + v)$

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Ephemeris for 1904.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1904	h m s	° ′ ″		m s
Apr. 20	13 52 56.36	+18 23 4.4	0.141756	11 31
28	13 46 26.64	18 21 44.2	0.149818	11 44
May 6	13 40 41.73	17 58 8.3	0.161620	12 3
14	13 36 8.03	17 13 55.6	0.176565	12 28
22	13 33 4.16	16 11 46.7	0.193973	12 59
30	13 31 38.94	14 55 4.2	0.213141	13 34
♂				
June 7	13 31 52.27	13 27 6.2	0.233469	14 13
15	13 33 40.77	11 50 41.0	0.254476	14 56
23	13 36 58.35	10 8 17.7	0.275728	15 40
July 1	13 41 36.03	8 22 5.2	0.296884	16 27
9	13 47 25.29	6 33 37.6	0.317735	17 16
17	13 54 18.93	4 44 11.3	0.338099	18 6
25	14 2 9.63	2 54 52.9	0.357812	18 56
Aug. 2	14 10 50.58	+ 1 6 34.9	0.376798	19 47

The corrections to this ephemeris, as determined by observations made at various observatories, are given in the following table. A few observations have been omitted when, on account of poor comparison stars or for other reasons, the corrections seemed doubtful:

Corrections to the Ephemeris.

Date.	Place.	O–C		Date.	Place.	O–C	
		α	δ			α	δ
1904		s	″	1904		s	″
Apr. 22	Algiers	+0.01	+1.0	May 3	Kasan	−0.06	−1.5
22	Algiers	−0.07	+1.1	3	Marseille	−0.17	−1.4
23	Düsseldorf	+0.03	+0.7	3	Rome	−0.03	−1.7
23	Kasan	−0.01	+1.1	4	Kasan	−0.09	−1.6
24	Rome	+0.06	+1.0	4	Rome	−0.13	−0.2
24	Kasan	−0.19	+0.4	5	Marseille	−0.17	−2.5
25	Kasan	−0.19	+0.2	6	Kasan	−0.14	−2.9
25	Düsseldorf	−0.14	−0.4	6	Düsseldorf	+0.06	−0.9
26	Kasan	−0.25	+0.1	7	Düsseldorf	+0.03	−0.9
27	Kasan	−0.26	0.0	7	Marseille	−0.22	−2.9
28	Kasan	−0.12	−0.7	8	Kasan	−0.37	−2.1
28	Kasan	−0.25	−0.8	9	Kasan	−0.14	−2.0
May 2	Kasan	−0.14	+0.1	9	Marseille	−0.04	−2.8
2	Kasan	+0.01	−0.9	10	Kasan	−0.16	−3.5
2	Marseille	−0.18	−0.8	10	Rome	−0.05	−1.5
2	Vienna	−0.02	−2.0	10	Marseille	−0.14	−0.2
3	Kasan	−0.28	−0.3	11	Marseille	−0.08	+0.6

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Corrections to the Ephemeris—Continued.

Date.	Place.	O–C α	O–C δ
1904		s	″
May 16	Rome	−0.35	− 2.3
16	Düsseldorf	−0.30	− 1.5
19	Düsseldorf	+0.27	− 1.7
19	Washington	+0.16	− 2.2
20	Marseille	+0.04	− 2.1
20	Washington	0.00	− 1.8
21	Rome	+0.08	− 1.5
22	Washington	+0.15	− 1.2
23	Washington	+0.01	+ 0.6
25	Rome	−0.05	+ 0.5
25	Washington	0.00	+ 0.6
27	Washington	+0.08	+ 2.2
28	Washington	+0.05	+ 2.9
29	Washington	+0.27	+ 4.9
June 3	Kasan	−0.12	+ 6.2
3	Düsseldorf	−0.09	+ 6.4
3	Washington	0.00	+ 5.0
4	Kasan	−0.04	+ 5.5
4	Jena	−0.15	+ 5.7
4	Düsseldorf	+0.07	+ 3.9
5	Düsseldorf	−0.05	+ 7.0
6	Rome	−0.04	+ 8.1
7	Kasan	+0.03	+ 8.4
7	Düsseldorf	+0.03	+ 8.1
8	Washington	+0.05	+ 9.6
9	Kasan	−0.02	+15.3
10	Kasan	−0.12	+16.3
11	Washington	−0.05	+10.5
12	Düsseldorf	−0.02	+12.0
12	Washington	−0.04	+14.5
13	Kasan	−0.36	+15.1
15	Rome	+0.20	+13.2
15	Rome	+0.03	+15.6
15	Kasan	−0.14	+17.0
15	Washington	−0.18	+15.6
18	Rome	−0.10	+18.7
18	Washington	−0.05	+18.7
20	Düsseldorf	−0.11	+23.5
21	Rome	−0.15	+23.4
23	Rome	−0.53	+26.3
23	Rome	−0.53	+26.9
June 27	Rome	−0.60	+33.3
30	Düsseldorf	−0.87	+32.4
July 1	Arcetri	−0.71	+35.8
1	Arcetri	−0.73	+37.9
1	Arcetri	−0.69	+35.2
1	Arcetri	−0.71	+36.1
3	Arcetri	−0.96	+37.8
4	Arcetri	−0.95	+38.7
4	Düsseldorf	−0.96	+42.4
6	Arcetri	−1.27	+41.7
6	Rome	−1.24	+42.5
7	Vienna	−1.22	+44.4
7	Arcetri	−1.25	+43.3
7	Arcetri	−1.24	+44.3
8	Arcetri	−1.06	+45.3
8	Arcetri	−1.26	+44.8
9	Arcetri	−1.29	+46.1
9	Arcetri	−1.23	+47.9
10	Arcetri	−1.18	+47.9
10	Arcetri	−1.31	+51.3
14	Rome	−1.85	+56.7
16	Arcetri	−2.09	+57.7
17	Arcetri	−2.03	+59.2
17	Arcetri	−2.18	+60.6
19	Arcetri	−1.96	+67.0
20	Arcetri	−2.11	+67.1
21	Arcetri	−2.11	+67.8
22	Rome	−2.52	+68.3
23	Arcetri	−2.68	+72.6
24	Rome	−2.97	+70.6
24	Arcetri	−2.76	+68.1
26	Arcetri	−3.09	+77.2
27	Arcetri	−3.02	+76.5
28	Arcetri	−3.24	+77.9
29	Arcetri	−3.35	+78.4
30	Arcetri	−3.38	+79.0
30	Arcetri	−3.13	+78.1
Aug. 1	Arcetri	−3.66	+84.1
1	Arcetri	−3.89	+82.8
2	Arcetri	−3.76	+82.7

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In forming the normal places, the observations are given equal weight. For the first normal place, the 12 observations from April 22 to April 28, inclusive, are used; for the second normal place, the 22 observations from May 2 to May 11, inclusive, are used; for the third normal place, the 14 observations from May 16 to May 29, inclusive, are used; for the fourth normal place, the 17 observations from June 3 to June 13, inclusive, are used; for the fifth normal place, the 12 observations from June 15 to June 30, inclusive, are used; for the sixth normal place, the 22 observations from July 1 to July 17, inclusive, are used, and for the seventh normal place, the 16 observations from July 19 to August 2, inclusive, are used. The normal places, with the corresponding values of log Δ derived from the provisional elements, are as follows:

Normal Places.	Berlin Mean Time.	True Equinox of Date.		Log Δ.
		α	δ	
		h m s	° ′ ″	
I	Apr. 25.5	13 48 49.04	+18 24 53.7	0.146326
II	May 6.5	13 40 41.62	+17 58 6.7	0.161620
III	22.5	13 33 4.19	+16 11 46.4	0.193973
IV	June 7.5	13 31 52.22	+13 27 15.4	0.233469
V	20.5	13 35 34.08	+10 47 36.7	0.267755
VI	July 7.5	13 45 50.49	+ 7 1 37.4	0.312563
VII	26.5	14 3 9.16	+ 2 42 31.2	0.360227

The provisional elements are corrected by the method of variation of geocentric distances so as to satisfy in the best possible manner these seven normal places. The first and last normal places are adopted as the base positions. With the coordinates α, δ, α'', and δ'' of these places, and with the assumed geocentric distances, $\log \Delta = 0.146326$ and $\log \Delta'' = 0.360227$, a set of elements of an orbit is computed. This constitutes Hypothesis I. For Hypothesis II, $\log \Delta$ is decreased by 500 in the sixth place, while the value of $\log \Delta''$ is left unchanged. For Hypothesis III, $\log \Delta''$ is decreased by 500 in the sixth place and the original value of $\log \Delta$ is used. Each of the three resulting orbits of course passes through the two base positions.

The following formulæ for computing the elements are taken directly from BOCCARDI'S, Guide du Calculateur, Deuxième Partie. The equator is the fundamental plane.

$$1)\begin{cases} \xi = \Delta \cos\alpha \cos\delta = x + X \\ \eta = \Delta \sin\alpha \cos\delta = y + Y \\ \zeta = \Delta \sin\delta = z + Z \\ r\cos l \cos b = x \\ r\sin l \cos b = y \\ r\sin b = z \end{cases}$$

$$2)\begin{cases} \tan i \sin(l-\Omega) = \tan b \\ \tan i \cos(l-\Omega) = \dfrac{\tan b'' - \tan b \cos(l''-l)}{\sin(l''-l)} \\ \tan u = \dfrac{\sin(l-\Omega)\cos i + \tan b \sin i}{\cos(l-\Omega)} \\ \tan u'' = \dfrac{\sin(l''-\Omega)\cos i + \tan b'' \sin i}{\cos(l''-\Omega)} \end{cases}$$

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3) *Checks.*

$$\cos 2f = \sin b \sin b'' + \cos b \cos b'' \cos (l'' - l)$$

$$u'' - u = 2f$$

$$\sin^2 \tfrac{1}{2}(u'' - u) = \sin^2 f = \sin^2 \tfrac{1}{2}(l'' - l) \cos b \cos b'' + \sin^2 \tfrac{1}{2}(b'' - b)$$

4)

$$\tau = k(t'' - t) \text{ where } k = 8.2355814$$

$$m = \frac{\tau^2}{(2 \cos f \sqrt{rr''})^3}$$

$$\tan (45^\circ + \omega) = \sqrt[4]{\frac{r''}{r}}$$

$$l = \frac{\sin^2 \tfrac{1}{2}f + \tan^2 2\omega}{\cos f}$$

5)

$$\alpha = \frac{2g - \sin 2g}{\sin^3 g}$$

$$\beta = l + \sin^2 \tfrac{1}{2}g$$

$$\alpha\beta + 1 = \eta$$

$$m = \eta^2 \beta$$

$$\tau = \eta \sqrt{\beta} (2 \sqrt{\cos f \sqrt{rr''}})^3$$

6)

$$r^2 \sin \tfrac{1}{2}(F - G) \cos \tfrac{1}{2}\varphi = \cos \tfrac{1}{2}(f + g) \tan 2\omega$$

$$r^2 \cos \tfrac{1}{2}(F - G) \cos \tfrac{1}{2}\varphi = \sin \tfrac{1}{2}(f + g) \sec 2\omega$$

$$r^2 \sin \tfrac{1}{2}(F + G) \sin \tfrac{1}{2}\varphi = \cos \tfrac{1}{2}(f - g) \tan 2\omega$$

$$r^2 \cos \tfrac{1}{2}(F + G) \sin \tfrac{1}{2}\varphi = \sin \tfrac{1}{2}(f - g) \sec 2\omega$$

$$r^2 = \frac{\sqrt{2m \cos f}}{\eta} \quad \text{Check.}$$

7)

$$v = F - f$$

$$v'' = F + f$$

$$E = G - g$$

$$E'' = G + g$$

$$\pi = u + \Omega - v = u'' + \Omega - v''$$

$$\tan \tfrac{1}{2}v = \tan \tfrac{1}{2}E \tan (45^\circ + \tfrac{1}{2}\varphi)$$

$$\tan \tfrac{1}{2}v'' = \tan \tfrac{1}{2}E'' \tan (45^\circ + \tfrac{1}{2}\varphi) \quad \text{Checks.}$$

8)

$$M = E - e'' \sin E$$

$$M'' = E'' - e'' \sin E''$$

$$\mu = \frac{M'' - M}{t'' - t}$$

$$k'' = \mu a^{\frac{3}{2}}$$

$$p = \left(\frac{\eta r r'' \sin 2f}{\tau}\right)^2 = a \cos^2 \varphi \quad \text{Check.}$$

Instead of determining g by trial, as it is necessary to do if one makes use of equations (5) of the foregoing formulæ, this quantity may readily be obtained by means of TABLES VIII and IX of OPPOLZER'S, Lehrbuch zur Bahnbestimmung der Kometen und Planeten, Erster Band. With the argument $h = \frac{m}{5/6 + l}$, enter TABLE VIII and take from it log η^2. With the argument $w = \frac{m}{\eta^2} - l$, enter TABLE IX and take from it ξ. Finally, with the argument $h = \frac{m}{5/6 + l + \xi}$, again enter TABLE VIII and take from it the final value of log η^2.

Then $$\sin^2 \tfrac{1}{2}g = w = \frac{m}{\eta^2} - l.$$

Base Positions and Values of Log Δ and Log Δ'' for the three Hypotheses.

Berlin Mean Time.	Base Positions.		Log Δ.		
	α (1904.0)	δ (1904.0)	Hyp. I.	Hyp. II.	Hyp. III.
1904	h m s	° ′ ″			
Apr. 25.5	13 48 48.45	+18 24 54.3	0.146326	0.145826	0.146326
July 26.5	14 3 7.57	+ 2 42 35.6	0.360227	0.360227	0.359727

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Computation of the Elements.

		Hyp. I.	Hyp. II.	Hyp. III.	Corrected Elements. (1st approximation).	Final Elements.
1)	x	0. 301783$_n$	0. 301489$_n$	0. 301783$_n$	0. 301863$_n$	0. 301904$_n$
	x''	0. 148270$_n$	0. 148270$_n$	0. 147571$_n$	0. 149336$_n$	0. 149400$_n$
	y	0. 057289$_n$	0. 057023$_n$	0. 057289$_n$	0. 057361$_n$	0. 057398$_n$
	y''	0. 289763$_n$	0. 289763$_n$	0. 289462$_n$	0. 290222$_n$	0. 290250$_n$
	z	9. 324309	9. 323260	9. 324309	9. 324593	9. 324739
	z''	9. 359355$_n$	9. 359355$_n$	9. 359591$_n$	9. 358992$_n$	9. 358971$_n$
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
	l	209 39 43. 9	209 39 49. 6	209 39 43. 9	209 39 42. 2	209 39 41. 4
	l''	234 10 21. 4	234 10 21. 4	234 11 51. 1	234 8 4. 5	234 7 56. 4
	b	+5 13 45. 3	+5 13 12. 5	+5 13 45. 3	+5 13 54. 2	+5 13 58. 7
	b''	−5 26 11. 1	−5 26 11. 1	−5 26 41. 3	−5 25 25. 0	−5 25 22. 3
	r	0. 364595	0. 364302	0. 364595	0. 364675	0. 364716
	r''	0. 382816	0. 382816	0. 382384	0. 383474	0. 383513
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
2)	i	23 44 16. 9	23 43 16. 4	23 44 1. 1	23 44 57. 2	23 45 7. 2
	Ω	41 40 27. 3	41 39 51. 0	41 40 36. 4	41 40 23. 2	41 40 27. 3
	u	166 54 52. 0	166 55 43. 2	166 54 43. 6	166 54 50. 6	166 54 44. 3
	u''	193 36 44. 1	193 37 17. 4	193 38 9. 7	193 34 24. 4	193 34 12. 3
3)	$2f$	26° 41′ 52″. 1	26° 41′ 34″. 2	26° 43′ 26″. 1	26° 39′ 33″. 8	26° 39′ 28″. 0
	$\cos 2f$	9. 951041	9. 951059	9. 950941	9. 951187	9. 951193
	$\sin b \sin b'' + \cos b \cos b'' \cos(l''-l)$	9. 951041	9. 951059	9. 950941	9. 951187	9. 951194
	$\sin^2 f$	8. 726774	8. 726614	8. 727608	8. 725544	8. 725494
	$\sin^2 \frac{1}{2}(l''-l)\cos b \cos b'' + \sin^2 \frac{1}{2}(b''-b)$	8. 726775	8. 726614	8. 727608	8. 725545	8. 725493
4)	τ	0. 199369	0. 199369	0. 199369	0. 199369	0. 199369
	m	8. 410215	8. 410644	8. 410935	8. 409005	8. 408883
	ω	0° 18′ 1″. 7	0° 18′ 19″. 1	0° 17′ 35″. 9	0° 18′ 36″. 2	0° 18′ 36″. 0
	l	8. 146038	8. 145989	8. 146733	8. 144997	8. 144943
5)	h (number)	0. 030350	0. 030380	0. 030400	0. 030267	0. 030258
	(Table VIII Opp.) η^2	0. 027827	0. 027853	0. 027870	0. 027755	0. 027747
	(Table IX Opp.) ξ^2 (number)	0. 0000059	0. 0000059	0. 0000059	0. 0000058	0. 0000058
	w	8. 005330	8. 006358	8. 005984	8. 004060	8. 003862
	g	11° 32′ 57″. 2	11° 33′ 46″. 6	11° 33′ 28″. 6	11° 31′ 56″. 3	11° 31′ 46″. 8
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
6)	F	36 27 13. 9	37 9 41. 0	35 41 21. 7	37 24 51. 8	37 22 50. 9
	G	31 0 49. 6	31 38 11. 4	30 23 0. 1	31 47 33. 6	31 45 34. 3
	φ	10 0 5. 0	9 59 4. 8	9 56 15. 6	10 6 19. 1	10 6 46. 4
	γ^2	9. 335760	9. 335964	9. 336090	9. 335210	9. 335154
	$\sqrt{2m\cos f + \eta}$	9. 335761	9. 335966	9. 336088	9. 335210	9. 335154

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Computation of the Elements—Continued.

		Hyp. I.	Hyp. II.	Hyp. III.	Corrected Elements. (1st approximation).	Final Elements.
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
7)	v	23 6 17.9	23 48 53.9	22 19 38.7	24 5 4.9	24 3 6.9
	v''	49 48 9.9	50 30 28.1	49 3 4.7	50 44 38.7	50 42 34.9
	E	19 27 52.4	20 4 24.8	18 49 31.5	20 15 37.3	20 13 47.5
	E''	42 33 46.8	43 11 58.0	41 56 28.7	43 19 29.9	43 17 21.1
	π	185 29 1.4	184 46 40.3	186 15 41.4	184 30 8.9	184 32 4.7
	$\tan \frac{1}{2} v$	9.310495	9.324014	9.295231	9.329050	9.328441
	$\tan \frac{1}{2} v''$	9.666718	9.673679	9.659219	9.675995	9.675659
	$\tan \frac{1}{2} E \tan (45°+\frac{1}{2}\varphi)$	9.310494	9.324014	9.295231	9.329051	9.328441
	$\tan \frac{1}{2} E'' \tan (45°+\frac{1}{2}\varphi)$	9.666717	9.673678	9.659219	9.675995	9.675659
		° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
8)	M	16 8 55.5	16 39 50.0	15 38 5.1	16 46 44.9	16 45 3.9
	M''	35 49 56.5	36 23 56.7	35 19 57.1	36 25 38.1	36 23 27.3
	μ	770″.228	772″.247	770″.783	768″.839	768″.515
	a	0.442259	0.441501	0.442050	0.442781	0.442903
	$(\eta r r'' \sin 2f+\tau)^2$	0.428956	0.428246	0.428920	0.429200	0.429302
	$a \cos^2 \varphi$	0.428958	0.428245	0.428920	0.429201	0.429302

The positions of the asteroid computed with the three sets of elements deduced from the three hypotheses and the normal places reduced to 1904.0 are as follows:

	Apr. 25.5	May 6.5	May 22.5	June 7.5	June 20.5	July 7.5	July 26.5
	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
α_I	207 12 6.7	205 10 5.8	203 15 29.7	202 57 19.2	203 52 43.0	206 26 54.0	210 46 53.8
α_{II}	207 12 6.9	205 9 58.5	203 15 21.0	202 57 14.2	203 52 41.1	206 26 54.9	210 46 54.2
α_{III}	207 12 6.4	205 10 2.0	203 15 16.9	202 57 1.5	203 52 23.0	206 26 38.9	210 46 52.5
Normals $=\alpha_N$	207 12 6.7	205 10 14.4	203 15 50.7	202 57 48.6	203 53 14.1	206 27 17.0	210 46 53.6
δ_I	+18 24 54.0	+17 58 23.1	+16 12 20.5	+13 27 55.6	+10 48 14.3	+7 2 3.5	+2 42 35.7
δ_{II}	+18 24 53.9	+17 58 21.0	+16 12 12.9	+13 27 44.8	+10 48 3.7	+7 1 56.3	+2 42 35.4
δ_{III}	+18 24 53.8	+17 58 34.9	+16 12 43.1	+13 28 21.2	+10 48 38.2	+7 2 18.7	+2 42 35.8
Normals $=\delta_N$	+18 24 54.3	+17 58 8.1	+16 11 48.8	+13 27 18.7	+10 47 40.5	+7 1 41.6	+2 42 35.6

The equations of condition for determining the corrections to $\log \Delta$ and $\log \Delta''$ are of the form

$$(\alpha_{II}-\alpha_I)\cos\delta\frac{d(\log\Delta)}{(-500)}+(\alpha_{III}-\alpha_I)\cos\delta\frac{d(\log\Delta'')}{(-500)}=(\alpha_N-\alpha_I)\cos\delta,$$

$$(\delta_{II}-\delta_I)\frac{d(\log\Delta)}{(-500)}+(\delta_{III}-\delta_I)\frac{d(\log\Delta'')}{(-500)}=\delta_N-\delta_I.$$

The factor $\cos\delta$ is introduced in the first of the preceding equations to make it equal in weight to the second equation. Each normal place, with the exception of the two base positions, gives two equations for determining $d(\log\Delta)$ and $d(\log\Delta'')$, and therefore, if we have more than three normal places altogether, we must resort to the method of *Least Squares*.

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Equations of Condition.

$$+69 \cdot \frac{d(\log \Delta)}{500} + 36 \cdot \frac{d(\log \Delta'')}{500} = +82$$

$$+84 \quad +123 \quad = +202$$
$$+49 \quad +172 \quad = +286$$
$$+19 \quad +196 \quad = +305$$
$$-09 \quad +150 \quad = +228$$
$$+21 \quad -118 \quad = -150$$
$$+76 \quad -226 \quad = -317$$
$$+108 \quad -256 \quad = -369$$
$$+106 \quad -239 \quad = -338$$
$$+72 \quad -152 \quad = -219$$

Solving these, we obtain $d(\log \Delta) = +135$ and $d(\log \Delta'') = +763$, and the first corrected distances are $\log \Delta = 0.146461$ and $\log \Delta'' = 0.360990$. With these values of the geocentric distances, the set of elements in the column headed *Corrected Elements* (1st approximation) are deduced. A comparison of the positions of the asteroid, computed from the latter elements, with the five intermediate normal places gives the following residuals:

Residuals.

Date.		May 6.5	May 22.5	June 7.5	June 20.5	July 7.5
		″	″	″	″	″
O-C	α	+2.4	+2.4	+1.5	+2.3	+1.9
	δ	+0.2	−0.7	−0.6	−1.2	−1.2

The first set of corrected elements is not sufficiently accurate, as shown by the residuals, and it is necessary to make another approximation. Strictly speaking, one ought to start again with this set as a first hypothesis and recompute new coefficients for $d(\log \Delta)$ and $d(\log \Delta'')$. However, all the accuracy desired can be obtained by simply substituting these new residuals in place of the old ones in the former equations of condition, remembering to multiply the residuals in α by the corresponding $\cos \delta$. When this is done, we obtain, as the new corrections, $d(\log \Delta) = +70$ and $d(\log \Delta'') = +46$. The final corrected distances are then $\log \Delta = 0.146531$ and $\log \Delta'' = 0.361036$, and with these values the final set of corrected elements are computed. A comparison of the positions computed from this last set of elements, with the intermediate normal places, gives as residuals,

Residuals.

Date.		May 6.5	May 22.5	June 7.5	June 20.5	July 7.5
		″	″	″	″	″
O-C	α	+0.7	+0.5	−1.2	+0.2	+1.1
	δ	+0.5	−0.2	+0.3	−0.6	−0.8

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This seems as good a representation of the normal places as could be expected. The final elements referred to the ecliptic are

Epoch: 1904, June 7.5, Berlin Mean Time.

	°	′	″			
M =	25	55	50.0			
π =	181	18	53.2		181	23	55.1
Ω =	108	14	32.0	Mean Ecliptic 1904.0	108	19	24.6	Mean Ecliptic 1910.0
i =	16	22	41.6		16	22	40.4
φ =	10	6	46.4				

$\mu = 768''.515$

$\log a = 0.442903$

If the magnitude be represented by $M = g + 5 (\log \Delta + \log r)$, we obtain from a discussion of the estimated magnitudes $g = 6^m.3$.

The perturbations of Jupiter and Saturn during the interval from June 7, 1904, to August 6, 1905, computed by the method of variation of parameters, produce the following changes in the elements:

		′	″
dM =	+8	48.4
$d\pi$ =	−7	37.1
$d\Omega$ =	−0	14.4
di =	+0	10.8
$d\varphi$ =	+0	2.9

$d\mu = +0''.450$

The elements, with these perturbations included, are

Final Elements.

Epoch: 1905, August 6.5, Berlin Mean Time.

	°	′	″	
M =	116	48	17.5	
π =	181	16	18.0	
Ω =	108	19	10.2	Mean Ecliptic 1910.0
i =	16	22	51.2	
φ =	10	6	49.3	

$\mu = 768''.965$

$\log a = 0.442734$

Heliocentric Coordinates 1905.0

		°	′	″
$x = r$ [9.983836] sin	(271	55	11.3	$+v$)
$y = r$ [9.979408] sin	(186	56	59.4	$+v$)
$z = r$ [9.605039] sin	(142	44	18.6	$+v$)

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With these elements the following ephemeris for 1905 was computed:

Ephemeris for 1905, including perturbations by Jupiter and Saturn.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1905	h m s	° ′ ″		m s
July 1	21 39 2.48	−22 1 10.8	0.333946	17 56
5	21 37 31.90	22 32 51.3	0.328315	17 41
9	21 35 39.87	23 5 51.7	0.323327	17 29
13	21 33 27.64	23 39 52.0	0.319050	17 19
17	21 30 56.66	24 14 29.9	0.315548	17 11
21	21 28 8.87	24 49 21.1	0.312886	17 5
25	21 25 6.32	25 24 0.0	0.311110	17 1
29	21 21 51.82	25 58 0.6	0.310261	16 58
Aug. 2	21 18 28.54	26 30 54.5	0.310378	16 58
6	21 14 59.98	27 2 18.1	0.311463	17 1
10	21 11 29.69	27 31 49.1	0.313504	17 6
14	21 8 1.49	27 59 7.9	0.316484	17 13
18	21 4 38.71	28 24 0.9	0.320362	17 22
22	21 1 24.73	28 46 16.8	0.325091	17 33
26	20 58 22.55	29 5 47.8	0.330613	17 47
30	20 55 35.26	29 22 28.9	0.336866	18 3
Sept. 3	20 53 5.57	29 36 21.8	0.343777	18 20
7	20 50 55.60	−29 47 27.5	0.351260	18 39

The corrections to this ephemeris, as determined by observations made at Rome, Arcetri, and Washington, are given in the following table:

Corrections to the Ephemeris.

Date.	Place.	O–C α	O–C δ	Date.	Place.	O–C α	O–C δ
1905		s	″	1905		s	″
July 1	Rome	−0.58	−12.3	Aug. 4	Arcetri	−0.38	−14.8
7	Washington	−0.66	−15.0	6	Washington	−0.74	−15.0
8	Washington	−0.53	−14.7	8	Arcetri	−0.48	−15.0
10	Rome	−0.37	−14.4	9	Arcetri	−0.32	−13.2
11	Arcetri	−0.59	−11.7	10	Arcetri	−0.33	−14.0
12	Arcetri*	−0.69	−14.4	12	Arcetri	−0.44	−10.9
15	Washington	−0.67	−14.4	15	Washington	−0.63	−13.8
20	Washington	−0.62	−13.0	17	Washington	−0.56	−12.5
26	Arcetri	−0.41	−16.0	18	Washington	−0.49	−14.5
26	Washington	−0.44	−13.7	22	Arcetri	−0.51	−13.7
27	Arcetri	−0.32	−14.8	22	Washington*	−0.65	−11.2
30	Arcetri	−0.56	−13.8	25	Arcetri	−0.63	−11.7
30	Washington*	−0.59	−15.1	30	Washington	−0.43	−11.9
Aug. 1	Arcetri	−0.49	−13.8	31	Washington	−0.47	−11.7
3	Arcetri	−0.57	−17.0	Sept. 6	Washington	−0.61	−13.5
3	Washington	−0.65	−14.5				

*Two observations.

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If we assign equal weights to these observations, we shall obtain as a normal place for 1905 [mean (O–C)$=-0^{s}.540;-13''.72$],

Berlin Mean Time.	True Equinox of Date.		
	α	δ	Log Δ.
1905 Aug. 4.5	h m s 21 16 44.16	° ′ ″ −26 47 2.7	0.310800

We can combine the seven normal places for 1904 into one and have as our final normal places for 1904 and 1905 referred to the mean equator and equinox of 1910.0,

Epoch.	Mean Equator and Equinox, 1910.0		
	α	δ	Log Δ.
1904 June 7.5	h m s 13 32 9.02	° ′ ″ +13 25 27.5	0.233469
1905 Aug. 4.5	21 17 0.37	−26 45 58.9	0.310800

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ELEMENTS OF (554) PERAGA.

By MATT FREDERICKSON.

This asteroid was discovered by WOLF at Königstuhl on January 8, 1905. A preliminary orbit was computed by the method given by TISSERAND in his Leçons sur la Détermination des Orbites, from two observations by PALISA at Vienna and one by HAMMOND at Washington.

These observations are as follows:

Date.	Place.	Local Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1905.0	
					α	δ	α	δ
1905		h m s	h m s	° ′ ″			s	″
Jan. 12	Vienna.....	17 45 33	8 28 58.81	+18 42 34.9	9.593	0.747	+0.19	+6.6
Feb. 10	Washington..	9 51 41	7 59 26.98	+19 27 28.4	8.983	0.469	+0.03	+7.6
Mar. 9	Vienna.....	8 19 33	7 50 28.52	+19 25 22.6	8.614	0.625	−0.16	+7.8

Provisional Elements.

Epoch: 1905, February 7.5, Berlin Mean Time.

$$M = 51\ 32\ 50.0$$
$$\omega = 124\ 41\ 8.8$$
$$\Omega = 295\ 43\ 24.2 \quad 1905.0$$
$$i = 2\ 56\ 7.3$$
$$\varphi = 8\ 52\ 22.8$$
$$\mu = 969''.423$$
$$\log a = 0.375666$$

Residuals.		Jan. 12.	Feb. 10.	Mar. 9.
		″	″	″
O−C	α	+3.0	−3.3	+0.4
	δ	+0.3	0.0	+0.5

Heliocentric Coordinates 1905.0

$$x = r\,[9.999538]\ \sin\ (150\ 26\ 18.8 + v)$$
$$y = r\,[9.958335]\ \sin\ (\ 59\ 13\ 17.5 + v)$$
$$z = r\,[9.623644]\ \sin\ (\ 66\ \ 9\ 34.2 + v)$$

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Ephemeris for 1905.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log ρ.	Aberr. Time.
1905	h m s	° ′ ″		m s
Jan. 8	8 33 15.41	+18 35 28.8	0.073250	9 50
12	8 29 13.18	18 42 15.5	0.070699	9 46
16	8 24 57.06	18 49 30.3	0.069657	9 44
20	8 20 33.41	18 56 51.4	0.070167	9 45
24	8 16 8.58	19 4 6.3	0.072238	9 48
28	8 11 48.90	19 10 53.0	0.075844	9 53
Feb. 1	8 7 40.77	19 16 59.5	0.080943	10 0
5	8 3 50.16	19 22 13.7	0.087447	10 9
9	8 0 22.26	19 26 28.9	0.095235	10 20
13	7 57 21.36	19 29 39.8	0.104165	10 33
17	7 54 50.72	19 31 43.0	0.114091	10 47
21	7 52 51.89	19 32 38.8	0.124878	11 4
25	7 51 26.01	19 32 28.1	0.136323	11 21
Mar. 1	7 50 33.97	19 31 9.9	0.148357	11 41
5	7 50 15.36	19 28 45.2	0.160827	12 1
9	7 50 29.85	19 25 14.6	0.173621	12 23
13	7 51 16.38	19 20 38.9	0.186611	12 45
17	7 52 33.33	+19 14 58.3	0.199713	13 8

The corrections to this ephemeris as determined by observations made at various observatories are given in the following table. The observations of March 29 and April 9 were compared with positions computed from the elements for the dates of observation.

Corrections to the Ephemeris.

Date.	Place.	O–C α	O–C δ	Date.	Place.	O–C α	O–C δ
1905		s	″	1905		s	″
Jan. 11	Rome	+0.43	+2.2	Jan. 28	Rome	−0.02	+1.7
12	Rome	+0.40	+0.1	28	Padua	+0.20	−0.2
12	Rome	+0.46	+0.1	31	Padua	−0.06	−0.1
12	Vienna	+0.20	+0.3	Feb. 1	Padua	+0.38	−0.8
13	Padua	+0.31	+0.2	3	Padua	0.00	+1.6
13	Düsseldorf	+0.35	−0.7	4	Padua	+0.10	+1.3
14	Rome	+0.31	−0.4	5	Padua	+0.31	+4.1
14	Düsseldorf	+0.34	−0.9	6	Arcetri	−0.02	+1.5
14	Padua	+0.26	+0.3	6	Arcetri	+0.07	−0.7
15	Düsseldorf	+0.32	−1.0	7	Arcetri	+0.19	−0.7
16	Vienna	+0.23	−2.3	8	Arcetri	+0.15	−1.6
22	Rome	+0.19	−0.9	9	Arcetri	−0.15	−1.8
23	Düsseldorf	0.00	−1.5	10	Arcetri	+0.07	−1.3
23	Padua	+0.33	−0.5	10	Vienna	−0.04	+1.4
27	Padua	+0.28	+0.1	10	Washington	−0.22	0.0

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Corrections to the Ephemeris—Continued.

Date.	Place.	O–C α	O–C δ	Date.	Place.	O–C α	O–C δ
1905		s	"	1905		s	"
Feb. 12	Arcetri	0.00	−4.6	Mar. 7	Arcetri	−0.04	+0.5
14	Washington	−0.16	+1.8	8	Arcetri	−0.07	+0.4
15	Washington	−0.38	+1.7	8	Arcetri	−0.13	−0.2
17	Washington	−0.30	−0.6	9	Arcetri	+0.02	+0.4
18	Washington	−0.29	+1.0	9	Arcetri	−0.02	−0.2
24	Washington	−0.20	−0.9	9	Vienna	+0.03	+0.5
26	Washington	−0.10	+0.3	12	Vienna	−0.06	−1.0
Mar. 1	Düsseldorf	−0.50	+1.8	13	Arcetri	+0.13	+0.4
5	Arcetri	+0.15	−0.4	13	Arcetri	+0.07	−0.9
6	Arcetri	+0.08	+1.2	29	Vienna	+0.30	+0.8
7	Arcetri	+0.05	+1.0	Apr. 9	Vienna	+0.62	−1.4
7	Arcetri	−0.06	+0.2				

Based upon the above corrections to the ephemeris five normal places were formed and the elements of the orbit were corrected by the method of variation of the geocentric distances. It is unnecessary to go into the details of the method here since it is identical with that used by J. C. HAMMOND in the correction of the elements of the orbit of (532) Herculina, see page B 79.

The normal places, the corresponding values of log Δ derived from the provisional elements, and the residuals obtained by comparison with positions computed from the corrected elements are as follows:

Normal Places.	Berlin Mean Time.	Mean Equinox of 1905.0 α	Mean Equinox of 1905.0 δ	Log Δ.	O–C α	O–C δ
	1905	h m s	° ′ ″		s	″
I	Jan. 13.5	8 28 10.71	+18 44 8.9	0.070296	....	...
II	Feb. 3.5	8 5 43.02	+19 19 51.1	0.084027	−0.03	+0.1
III	19.5	7 53 47.37	+19 32 27.7	0.119390	+0.19	+0.2
IV	Mar. 9.5	7 50 29.64	+19 25 22.7	0.173621	−0.25	0.0
V	Apr. 3.5	8 2 57.40	+18 38 49.0	0.255037	....	...

The corrected elements are as follows:

Corrected Elements.

Epoch: 1905, February 7.5, Berlin Mean Time.

	°	′	″	
M =	51	31	13.0	
ω =	124	43	24.7	1905.0
Ω =	295	43	23.7	1905.0
i =	2	56	4.5	1905.0
φ =	8	52	13.7	

$\mu = 969''.479$

$\log a = 0.375646$

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Heliocentric Coordinates 1906.0

$$x = r\,[9.999538]\,\sin(150\ 29\ 24.4 + v)$$
$$y = r\,[9.958333]\,\sin(\ 59\ 16\ 24.5 + v)$$
$$z = r\,[9.623647]\,\sin(\ 66\ 12\ 31.7 + v)$$

An ephemeris for 1906 was computed from the above corrected elements:

Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1906	h m s	° ′ ″		m s
Apr. 21	16 6 25.74	−24 50 47.9	0.265350	15 18
25	16 3 36.69	24 45 19.8	0.258670	15 4
29	16 0 25.65	24 38 10.0	0.252796	14 52
May 3	15 56 55.53	24 29 18.9	0.247814	14 42
7	15 53 9.81	24 18 48.6	0.243797	14 34
11	15 49 12.14	24 6 44.5	0.240805	14 28
15	15 45 6.44	23 53 12.9	0.238895	14 24
19	15 40 57.06	23 38 25.9	0.238093	14 22
23	15 36 48.64	23 22 36.1	0.238424	14 23
27	15 32 45.73	23 6 2.6	0.239874	14 26
31	15 28 52.83	22 49 3.2	0.242415	14 31
June 4	15 25 13.25	22 31 56.6	0.246002	14 38
8	15 21 50.63	22 15 2.6	0.250556	14 47
12	15 18 47.57	21 58 40.2	0.256003	14 59
16	15 16 6.30	21 43 5.4	0.262264	15 12
20	15 13 48.78	21 28 33.8	0.269253	15 27
24	15 11 56.34	21 15 19.3	0.276872	15 43
28	15 10 29.85	−21 3 32.0	0.285025	16 0

The corrections to this ephemeris as determined by observations made by ABETTI at Arcetri and by FREDERICKSON at Washington are as follows:

Corrections to the Ephemeris.

Date.	Place.	O-C α	O-C δ	Date.	Place.	O-C α	O-C δ
1906		m s	′ ″	1906		m s	′ ″
Apr. 23	Washington	+0 36.78	−1 13.1	May 23	Washington	+0 38.52	−1 48.1
23	Washington	+0 36.56	−1 14.5	25	Arcetri	+0 38.41	−1 53.4
27	Washington	+0 37.29	−1 18.7	25	Arcetri	+0 38.65	−1 51.0
May 4	Washington	+0 38.30	−1 25.3	28	Arcetri	+0 38.44	−1 48.1
4	Washington	+0 38.24	−1 25.8	29	Arcetri	+0 38.64	−1 50.3
10	Washington	+0 39.08	−1 33.8	29	Arcetri	+0 38.51	−1 47.2
20	Washington	+0 38.88	−1 44.3	June 14	Arcetri	+0 36.06	−1 57.8
22	Arcetri	+0 38.86	−1 48.6	15	Arcetri	+0 35.57	−1 56.7
22	Washington	+0 38.65	−1 48.9	17	Arcetri	+0 35.81	−1 59.8
23	Arcetri	+0 38.72	−1 50.4	17	Arcetri	+0 35.47	−1 55.5
23	Arcetri	+0 38.84	−1 50.0	22	Arcetri	+0 34.55	−1 56.6
23	Washington	+0 38.50	−1 49.0	25	Arcetri	+0 33.77	−1 55.2

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Two normal places were formed from observations selected from 1905 and two from observations selected from 1906, and the elements were again corrected.

The heliocentric spherical coordinates and distances for the two extreme dates were computed from the following formulæ given in WATSON'S Theoretical Astronomy, pages 358–359, where the ecliptic is taken as the fundamental plane;

$$\tan(l-\lambda)=\frac{R\sin(\lambda-\odot)}{x_0},$$

$$\rho=\frac{R\sin(l-\odot)}{\sin(l-\lambda)},$$

$$r_0=\frac{R\sin(\lambda-\odot)}{\sin(l-\lambda)},$$

$$\tan b=\frac{\rho\tan\beta}{r_0},$$

$$r=\frac{r_0}{\cos b}.$$

In these formulæ ρ represents the curtate distance. Increments were assigned to the coordinate x_0 and elements corresponding to these various values of x_0 were computed. The values of x_0 used first were those derived from the approximate elements. The normal places of the two intermediate dates were compared with positions computed from the elements corresponding to the various values of x_0. Based upon these residuals, equations of condition were formed for determining the corrections to be applied to x_0. The formulæ given in BOCCARDI'S Guide du Calculateur, Deuxième Partie, were used in solving the ellipse; g was determined by the formulæ given in TISSERAND'S Leçons sur la Détermination des Orbites.

It was found that η was outside of the limits of TABLE VIII, d'OPPOLZER, and an auxiliary table giving η^2 with argument h was computed.

The equation

$$\eta-1=\frac{h(\eta+\frac{1}{3})}{\eta^2},$$

gives η as a function of h, see TISSERAND, page 66.

The following is a solution of this equation not given by TISSERAND. The equation may be written

$$\eta^3-\eta^2-h\eta-\tfrac{1}{3}h=0.$$

Substituting $y+\frac{1}{3}$ for η we have

$$(h+\tfrac{1}{3})y-y^3=-\tfrac{2}{3}(h+\tfrac{1}{6}).$$

Let

$$(\tfrac{4}{3})^{\frac{1}{2}}(h+\tfrac{1}{3})^{\frac{1}{2}}\sin\theta=y,$$

then

$$(\tfrac{4}{3})^{\frac{1}{2}}(h+\tfrac{1}{3})^{\frac{1}{2}}\sin\theta-[(\tfrac{4}{3})^{\frac{1}{2}}(h+\tfrac{1}{3})^{\frac{1}{2}}\sin\theta]^3=-\tfrac{2}{3}(h+\tfrac{1}{6}),$$

$$3\sin\theta-4\sin^3\theta=-(\tfrac{4}{3})^{\frac{1}{2}}\frac{(h+\frac{1}{6})}{(h+\frac{1}{3})^{\frac{3}{2}}},$$

or

$$\sin_3\theta=-(\tfrac{4}{3})^{\frac{1}{2}}\frac{(h+\frac{1}{6})}{(h+\frac{1}{3})^{\frac{3}{2}}}=[0.0624694_n]\frac{(h+\frac{1}{6})}{(h+\frac{1}{3})^{\frac{3}{2}}}.$$

Then it follows that

$$\eta=y+\tfrac{1}{3}=(\tfrac{4}{3})^{\frac{1}{2}}(h+\tfrac{1}{3})^{\frac{1}{2}}\sin\theta+\tfrac{1}{3}=[0.0624694](h+\tfrac{1}{3})^{\frac{1}{2}}\sin\theta+\tfrac{1}{3}.$$

The solution fails when

$$(\tfrac{4}{3})^{\frac{1}{2}}\frac{(h+\frac{1}{6})}{(h+\frac{1}{3})^{\frac{3}{2}}}>1.$$

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These formulæ give three values for η. The value of η which results when 3θ is chosen in the third quadrant has been adopted since the other values of 3θ give negative roots.

Below may be found the computation of the heliocentric coordinates and that of η:

Heliocentric Coordinates.		
Normal Places.	I	IV
	° ′ ″	° ′ ″
λ	124 48 52.9	232 23 18.7
β	−0 21 6.1	−3 25 57.7
$\odot$	293° 10′ 25″.5	85° 49′ 0″.7
log R	9.992819	0.006941
log x_0	0.330227	0.427937
log tan $(l-\lambda)$	8.967465	9.320071
log ρ	0.070301	0.262631
log r_0	0.332088	0.437217
log tan b	7.526262_n	8.603447_n
log r	0.332090	0.437566
	° ′ ″	° ′ ″
l	119 30 49.8	244 11 29.2
b	−0 11 32.9	−2 17 52.6

η	
Let [0.0624694]=log H.	
h	4.911581
$h+\frac{1}{6}$	5.078248
$h+\frac{1}{3}$	5.244914
log $(-H)$ $(h+\frac{1}{6})$	0.7681848_n
log $(h+\frac{1}{3})^{\frac{1}{2}}$	1.0796076
log sin 3θ	9.6885772_n
	° ′ ″
3θ	209 13 15.0
θ	69 44 25.0
log H $(h+\frac{1}{3})^{\frac{1}{2}}$	0.4223386
log sin θ	9.9722641
log H $(h+\frac{1}{3})^{\frac{1}{2}}$ sin θ	0.3946027
H $(h+\frac{1}{3})^{\frac{1}{2}}$ sin $\theta+\frac{1}{3}=\eta$	+2.814195

The normal places reduced to the same equinox are given in the following table:

Normal Places.	Berlin Mean Time.	Mean Equinox of 1907.0	
		α	δ
		h m s	° ′ ″
I	1905, Jan. 13.5	8 28 17.57	+18 43 44.7
II	1905, Mar. 9.5	7 50 36.62	+19 25 3.9
III	1906, Apr. 28.5	16 1 55.98	−24 41 41.0
IV	1906, June 17.5	15 16 7.62	−21 41 33.0

The final elements are

Final Elements.

Epoch: 1906, June 17.5, Berlin Mean Time.

	° ′ ″	
M	= 184 44 29.3	
ω	= 124 52 47.3	1907.0
Ω	= 295 45 14.3	1907.0
i	= 2 55 57.7	1907.0
φ	= 8 50 16.4	

$\mu = 969''.481$

log $a = 0.375645$

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The residuals obtained by comparison of the two middle observations with positions computed from the above elements are as follows:

Berlin Mean Time.	O–C	
	λ	β
	"	"
1905, Mar. 9.5	−8.4	−2.0
1906, Apr. 28.5	−3.5	−0.9

Heliocentric Coordinates 1907.0

$$x = r\,[9.999539]\ \sin\ (150\ 39\ 47.3 + v)$$
$$y = r\,[9.958334]\ \sin\ (\ 59\ 26\ 50.7 + v)$$
$$z = r\,[9.623639]\ \sin\ (\ 66\ 22\ 38.6 + v)$$

An ephemeris for 1907 was computed from the elements.

Ephemeris for 1907.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1907	h m s	° ′ ″		m s
Aug. 28	23 40 48.40	+2 18 56.8	0.099288	10 26
Sept. 1	23 37 45.74	2 7 30.8	0.091838	10 16
5	23 34 25.27	1 53 29.9	0.085588	10 7
9	23 30 51.20	1 37 13.1	0.080639	10 0
13	23 27 8.45	1 19 5.6	0.077115	9 55
17	23 23 22.31	0 59 36.2	0.075028	9 52
21	23 19 38.02	0 39 16.4	0.074408	9 52
25	23 16 0.71	+0 18 37.5	0.075243	9 53
29	23 12 35.40	−0 1 51.6	0.077503	9 56

The corrections to this ephemeris as determined by observations at Washington are as follows:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1907	m s	′ ″	1907	m s	′ ″
Aug. 30	−0 19.91	−2 4.6	Sept. 20	−0 20.32	−2 14.9
Sept. 6	−0 19.83	−2 7.7	20	−0 20.31	−2 15.2
11	−0 20.09	−2 11.4	29	−0 20.19	−2 11.6
13	−0 20.34	−2 14.5			

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PROVISIONAL ELEMENTS OF (599) [1906 UJ].

By J. C. HAMMOND and MATT FREDERICKSON.

This asteroid was discovered by METCALF at Taunton, Mass., on April 25, 1906. This preliminary orbit was computed from three observations made at Washington, using the method given by TISSERAND in his Leçons sur la Détermination des Orbites.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
Apr. 28	11 38 40	14 40 12.29	−13 10 54.4	8.873_n	0.839	−0.28	−3.4
May 16	10 31 12	14 21 27.83	−13 14 22.7	8.474_n	0.840	−0.44	−2.0
29	10 9 20	14 9 43.72	−13 24 22.9	8.734	0.840	−0.57	−1.1

Provisional Elements.

Epoch: 1906, May 16.5, Berlin Mean Time.

M	= 283 43 19.5	
ω	= 288 49 31.8	1906.0
Ω	= 45 32 11.8	1906.0
i	= 16 23 13.5	1906.0
φ	= 17 28 25.4	

$\mu = 764''.318$

$\log a = 0.444489$

$m_0 = 12.4 \qquad g = 8.8$

Heliocentric Coordinates 1906.0

$x = r\,[9.991013] \sin(63\ 10\ 27.3 + v)$

$y = r\,[9.917185] \sin(341\ 13\ 33.7 + v)$

$z = r\,[9.776712] \sin(317\ 10\ 55.7 + v)$

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Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1906	h m s	° ′ ″		m s
Apr. 28	14 40 26.28	−13 10 49.4	0.274640	15 38
♂ May 2	14 36 15.40	13 11 13.4	0.271253	15 31
6	14 32 1.55	13 11 41.7	0.268937	15 26
10	14 27 48.45	13 12 23.9	0.267691	15 23
14	14 23 39.93	13 13 29.7	0.267511	15 23
18	14 19 39.77	13 15 9.4	0.268370	15 25
22	14 15 51.69	13 17 34.1	0.270227	15 29
26	14 12 19.03	13 20 54.6	0.273020	15 35
30	14 9 4.80	13 25 21.1	0.276672	15 43
June 3	14 6 11.23	13 31 2.0	0.281103	15 52
7	14 3 40.08	13 38 3.4	0.286217	16 4
11	14 1 32.61	13 46 29.5	0.291931	16 16
15	13 59 49.79	13 56 25.3	0.298151	16 31
19	13 58 32.34	14 7 52.9	0.304800	16 46
23	13 57 40.63	14 20 54.9	0.311793	17 2
27	13 57 14.65	14 35 32.1	0.319053	17 19
July 1	13 57 14.15	14 51 44.2	0.326499	17 37
5	13 57 38.36	15 9 27.6	0.334064	17 56
9	13 58 26.70	15 28 39.7	0.341695	18 15
13	13 59 38.41	15 49 17.5	0.349344	18 34
17	14 1 12.88	16 11 17.0	0.356969	18 54
21	14 3 9.49	16 34 35.5	0.364535	19 14
25	14 5 27.39	−16 59 8.3	0.371996	19 34

The observations at Washington in 1906 give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date	O–C	
	α	δ		α	δ		α	δ
1906	s	″	1906	s	″	1906	s	″
Apr. 28	−0.03	+0.1	May 18	−0.06	− 5.0	June 25	−2.26	+22.3
29	−0.04	−0.8	20	+0.12	− 0.6	July 6	−4.88	+41.7
May 3	−0.21	−0.9	22	+0.09	− 1.3	12	−6.53	+52.1
4	−0.27	−1.4	24	−0.10	− 2.3	13	−7.08	+55.1
9	−0.30	−1.7	29	−0.03	+ 0.3	19	−9.00	+68.8
10	−0.35	+1.6	June 11	−0.59	+ 6.4	21	−9.86	+72.6
16	−0.02	+0.1	22	−1.76	+19.4			

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CORRECTED ELEMENTS OF (599) [1906 UJ].

By MATT FREDERICKSON.

Based upon the corrections to the ephemeris derived from the provisional elements given in the preceding article six normal places were formed and the elements of the orbit were corrected. The heliocentric spherical coordinates for the extreme places were found by the formulæ given on pages 358–359 of WATSON's Theoretical Astronomy, and the coordinate x_0 was varied as in the case of (554) Peraga, see page B 90.

Normal Places.	Berlin Mean Time.	Mean Equinox of 1906.0	
		α	δ
	1906	h m s	° ′ ″
I	Apr. 28.5	14 40 26.24	−13 10 49.7
II	May 7.5	14 30 57.78	−13 11 51.9
III	22.5	14 15 51.70	−13 17 35.3
IV	June 20.5	13 58 15.40	−14 10 43.0
V	July 10.5	13 58 36.43	−15 32 52.5
VI	21.5	14 2 59.69	−16 33 23.2

The corrected elements are as follows:

Corrected Elements.

Epoch: 1906, April 28.5, Berlin Mean Time.

	°	′	″	
M =	278	5	44.3	
ω =	290	3	43.5	1906.0
Ω =	45	29	46.7	1906.0
i =	16	33	44.8	1906.0
φ =	17	15	7.2	

$\mu = 768''.430$

$\log a = 0.442935$

Residuals.

Date.		May 7.5	May 22.5	June 20.5	July 10.5
		″	″	″	″
O–C	λ	−0.4	+0.7	−0.7	0.0
	β	+0.5	+1.3	−1.4	−0.3

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Heliocentric Coordinates 1907.0

$$x = r\,[9.990829]\,\sin(64^\circ\,21'\,30.5'' + v)$$
$$y = r\,[9.916601]\,\sin(342^\circ\,31'\,44.8'' + v)$$
$$z = r\,[9.778312]\,\sin(318^\circ\,17'\,28.4'' + v)$$

Ephemeris for 1907.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1907	h m s	° ′ ″		m s
Oct. 1	3 4 7.00	+ 8 57 18.3	0.105520	10 36
5	3 1 24.18	9 16 21.3	0.099703	10 27
9	2 58 9.72	9 35 8.2	0.094916	10 20
13	2 54 26.93	9 53 43.0	0.091291	10 15
17	2 50 19.71	10 12 6.9	0.088960	10 12
21	2 45 53.10	10 30 22.4	0.088007	10 10
25	2 41 12.24	10 48 30.1	0.088513	10 11
29	2 36 23.02	11 6 32.4	0.090521	10 14
Nov. 2	2 31 31.66	11 24 30.5	0.094052	10 19
6	2 26 44.43	11 42 29.3	0.099093	10 26
10	2 22 7.67	12 0 35.6	0.105585	10 36
14	2 17 47.07	12 18 55.3	0.113432	10 47
18	2 13 47.24	12 37 35.0	0.122514	11 1
22	2 10 12.05	12 56 39.3	0.132694	11 17
26	2 7 4.28	13 16 13.5	0.143837	11 34
30	2 4 26.09	13 36 21.9	0.155803	11 54
Dec. 4	2 2 18.96	+13 57 9.7	0.168455	12 15

The observations at Jena, Copenhagen, Nice, Kasan, Düsseldorf, and Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	Place.	O–C α	O–C δ	Date.	Place.	O–C α	O–C δ
1907		m s	′ ″	1907		m s	′ ″
Sept. 29	Washington.....	−0 19.99	−4 10.1	Nov. 6	Jena.....	−0 23.82	−3 44.2
Oct. 1	Washington.....	−0 20.46	−4 8.7	6	Padua.....	−0 22.92	−3 46.5
5	Washington.....	−0 21.19	−4 8.9	7	Kasan.....	−0 24.03	−3 45.4
6	Washington.....	−0 21.31	−4 11.0	7	Düsseldorf.....	−0 23.65	−3 44.3
13	Washington.....	−0 22.45	−4 8.1	7	Copenhagen	−0 23.76	−3 44.2
18	Copenhagen	−0 22.96	−4 5.7	7	Copenhagen	−0 24.18	−3 44.4
Nov. 3	Washington.....	−0 23.73	−3 49.3	8	Copenhagen	−0 23.83	−3 44.1
3	Jena.....	−0 23.78	−3 51.7	9	Copenhagen	−0 23.75	−3 41.9
4	Nice.....	−0 23.68	−3 47.0	12	Nice.....	−0 23.39	−3 37.0
4	Jena.....	−0 23.63	−3 46.3	22	Kasan.....	−0 22.58	−3 21.0
6	Nice.....	−0 24.08	−3 45.7	24	Kasan.....	−0 22.13	−3 17.1

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ELEMENTS OF (600) [1906 UM].

By J. C. HAMMOND and MATT FREDERICKSON

This asteroid was discovered by METCALF at Taunton, Mass., on June 14, 1906. The following provisional elements were computed from four observations made at Washington, using the method given in BAUSCHINGER'S Bahnbestimmung der Himmelskörper.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
June 22	11 33 30	17 37 32.68	− 9 49 8.2	7.662_n	0.819	−0.75	−6.6
30	10 15 53	17 30 45.29	−10 16 8.1	8.925_n	0.820	−0.84	−6.0
July 12	11 35 57	17 22 13.75	−11 10 12.7	9.270	0.820	−0.97	−5.6
26	11 31 43	17 16 26.57	−12 27 9.4	9.457	0.815	−1.12	−4.9

Provisional Elements.

Epoch: 1906, June 22.5, Berlin Mean Time.

	°	′	″	
M =	12	41	3.5	
ω =	112	42	28.8	1906.0
Ω =	139	34	54.6	1906.0
i =	10	11	20.0	1906.0
φ =	3	8	12.2	

$\mu = 817''.198$

$\log a = 0.425120$

ω is the longitude of perihelion counted from the node.

Residuals.		June 30.	July 12.
		″	″
O-C	λ	−0.5	−0.6
	β	−0.6	−2.3

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Heliocentric Coordinates 1906.0

$$x = r\,[9.997125]\sin(342^\circ\ 44'\ 19.5'' + v)$$
$$y = r\,[9.983796]\sin(254^\circ\ 34'\ 49.3'' + v)$$
$$z = r\,[9.464853]\sin(230^\circ\ 29'\ 17.0'' + v)$$

Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
	h m s	° ′ ″		m s
δ 1906 June 22	17 37 44.63	− 9 48 26.4	0.182942	12 40
26	17 34 14.39	10 0 56.2	0.184981	12 43
30	17 30 53.48	10 15 24.0	0.188138	12 49
July 4	17 27 45.69	10 31 40.9	0.192359	12 56
8	17 24 54.22	10 49 36.0	0.197563	13 6
12	17 22 21.81	11 8 59.4	0.203682	13 17
16	17 20 10.86	11 29 40.0	0.210630	13 30
20	17 18 23.43	11 51 27.1	0.218318	13 44
24	17 17 1.14	12 14 9.0	0.226645	14 0
28	17 16 5.01	−12 37 35.3	0.235515	14 17

With the exception of the photographic observations at Taunton, the only observations of this asteroid in 1906 were made at Washington. The latter give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date	O–C	
	α	δ		α	δ		α	δ
1906	s	″	1906	s	″	1906	s	″
June 22	−0.01	+0.3	July 12	+0.03	−1.3	July 21	+0.06	+2.9
22	0.00	+1.3	13	+0.16	−3.5	24	+0.10	+3.8
24	−0.02	+1.9	15	+0.13	+1.0	26	0.00	−0.6
25	−0.19	+1.0	19	+0.14	−0.5	26	+0.08	+0.1
30	+0.01	−0.6	21	+0.07	+3.5			

The estimated magnitudes in 1906 were: 12.6 on July 12, 13.0 on July 15, and 13.0 on July 19.

If the magnitude be represented by the relation

$$M = g + 5\,(\log\Delta + \log r),$$

and if we put

$$m_0 = g + 5\,[\log a + \log(a-1)],$$

we shall have

$$g = 9.8 \text{ and } m_0 = 13.0.$$

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Heliocentric Coordinates for 1907.0

$$x = r\,[9.997127]\,\sin(342\ 45\ 9.8 + v)$$
$$y = r\,[9.983800]\,\sin(254\ 35\ 36.9 + v)$$
$$z = r\,[9.464799]\,\sin(230\ 30\ 20.9 + v)$$

Ephemeris for 1907.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1907	h m s	° ′ ″		m s
Oct. 9	1 28 51.45	−5 16 5.8	0.245673	14 38
13	1 25 37.03	5 43 19.7	0.246367	14 39
17	1 22 21.51	6 8 17.9	0.248146	14 43
21	1 19 8.53	6 30 37.0	0.250996	14 48
25	1 16 1.63	6 49 59.0	0.254863	14 56
29	1 13 4.14	7 6 8.8	0.259699	15 6
Nov. 2	1 10 19.13	7 18 55.8	0.265435	15 18
6	1 7 49.48	−7 28 12.3	0.271998	15 32

Magnitude about 13.2.

Five observations made at Washington give the following rather large corrections:

Corrections to the Ephemeris.

Date.	O-C		Date.	O-C	
	α	δ		α	δ
1907	s	″	1907	s	″
Oct. 24	−191.52	−868.3	Oct. 30	−188.17	−840.3
29	−188.79	−844.7	Nov. 4*	−184.78	−814.8

* Two observations.

The provisional elements are in need of correction. If we decrease M arbitrarily by 34′ 35″, leaving the other elements unchanged, the correction to an ephemeris computed with this assumption, as given by the observation of October 24, is $-0^s.5$ in α, $-14''$ in δ.

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ELEMENTS OF (611) [1906 VL].

By J. C. HAMMOND.

This asteroid was discovered by METCALF at Taunton, Mass., on September 24, 1906. Provisional elements were computed from three observations made at Washington, by the method given by Dr. W. EBERT in his Eine einfache Methode zur Bestimmung elliptischer Bahnen aus drei Beobachtungen. (Denkschr. d. kais. Akad. d. Wissensch., mathem.-naturw. Kl., Bd. LXXVIII.) This method is an elegant one, and the formulæ for the ecliptic, with the results of the computation for this asteroid, are given here:

Quantities given.

$$\begin{array}{lllll} t_1, & \lambda_1, & \beta_1, & \log R_1, & L_1 = 180 + \odot_1 \\ t_2, & \lambda_2, & \beta_2, & \log R_2, & L_2 = 180 + \odot_2 \\ t_3, & \lambda_3, & \beta_3, & \log R_3, & L_3 = 180 + \odot_3 \end{array}$$

(1)
$$\begin{cases} \tan \kappa = \dfrac{\tan \beta_2}{\sin (\lambda_2 - L_2)}, \quad 0° < \kappa < 90° \\ \tan \psi = \dfrac{\tan (\lambda_2 - L_2)}{\cos \kappa}, \quad 90° < \psi < 180° \\ \text{Control: } \cos \psi = \cos \beta_2 \cos (\lambda_2 - L_2) \end{cases}$$

(2)
$$\begin{cases} \tan I \sin (\lambda_1 - K) = \tan \beta_1 \\ \tan I \cos (\lambda_1 - K) = \dfrac{\tan \beta_1 \cos (\lambda_1 - \lambda_3) - \tan \beta_3}{\sin (\lambda_1 - \lambda_3)} \\ 0° < I < 90° \\ \text{Control: } \tan \beta_3 = \tan I \sin (\lambda_3 - K) \end{cases}$$

(3) $$\{(\sin h_2) = \sin \beta_2 \cos I - \cos \beta_2 \sin I \sin (\lambda_2 - K)$$

(4)
$$\begin{cases} Z_1 = R_1 \sin I \sin (L_1 - K) \\ Z_2 = R_2 \sin I \sin (L_2 - K) \\ Z_3 = R_3 \sin I \sin (L_3 - K) \end{cases}$$

(5)
$$\begin{cases} \tau_1 = t_3 - t_2, \ \tau_3 = t_2 - t_1, \ \tau = t_3 - t_1 = \tau_1 + \tau_3 \\ v_1 = \dfrac{\tau_1}{\tau}, \ v_3 = \dfrac{\tau_3}{\tau} \\ Q_1 = {}^3/_5 - {}^8/_5 v_1^2, \ Q_3 = {}^3/_5 - {}^8/_5 v_3^2 \\ \Pi = {}^5/_8 k^2 \tau^2, \ \log {}^5/_8 k^2 = 5.4888917 \\ \log {}^8/_5 = 0.2041200, \ \log {}^{16}/_5 = 0.5051500 \\ \text{Control: } Q_1 + Q_3 + {}^2/_5 = {}^1/_5 v_1 v_3 \end{cases}$$

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The values of Q_1, Q_3, and Π must be calculated with the greatest care. If the intervals are quite unequal, one of the values Q may be negative.

$$(6)\quad \begin{cases} E = Z_2 - R_2 \ (\sin h_2) \cos \psi \\ F = (Z_1 v_1) + (Z_3 v_3) \\ G = (Z_1 v_1) Q_1 + (Z_3 v_3) Q_3 \\ h'' = \dfrac{\Pi a''}{c''(R_2 \sin \psi)^3} \\ a'' \cos A'' = E + G \\ a'' \sin A'' = R_2 \ (\sin h_2) \sin \psi \\ c'' \cos C'' = E - F \\ c'' \sin C'' = R_2 \ (\sin h_2) \sin \psi \\ B'' = C'' - A'' \end{cases}$$

If $(\sin h_2)$ is negative, we take both a'' and c'' negative.

$$(7)\quad \sin \vartheta'' = h'' \sin^3 (\vartheta'' + C'') \sin (\vartheta'' + B'')$$

This equation must be solved by trial and as the first approximation we put

$$\sin \vartheta'' = h'' \sin^3 C'' \sin B'',$$

ϑ'' is always a very small angle.

$$(8)\quad \begin{cases} \chi = C'' + \vartheta'', \ r_2 = \dfrac{R_2 \sin \psi}{\sin \chi}, \ \Delta_2 = \dfrac{R_2 \sin (\chi + \psi)}{\sin \chi} \\ V = \dfrac{\Pi}{r_2^3}, \ \Sigma_1 = 1 + V Q_1, \ \Sigma_3 = 1 + V Q_3 \\ T_1 = \dfrac{v_1 \Sigma_1}{1 - V}, \ T_3 = \dfrac{v_3 \Sigma_3}{1 - V} \\ \text{Control: } Z_2 = Z_1 T_1 + Z_3 T_3 + \Delta_2 \ (\sin h_2) \end{cases}$$

$$(9)\quad \begin{cases} [\rho_2] = \Delta_2 \cos \beta_2, \text{ the middle curtate distance:} \\ r_2 \cos b_2 \cos (l_2 - L_2) = [\rho_2] \cos (\lambda_2 - L_2) + R_2 \\ r_2 \cos b_2 \sin (l_2 - L_2) = [\rho_2] \sin (\lambda_2 - L_2) \\ r_2 \sin b_2 = [\rho_2] \tan \beta_2 \end{cases}$$

The values of r_2 derived from (8) and (9) should agree.

$$(10)\quad \begin{cases} [r_2] = r_2 \cos b_2 \\ G_1 = T_1 R_1 \sin (\lambda_3 - L_1) + T_3 R_3 \sin (\lambda_3 - L_3) + [r_2] \sin (l_2 - \lambda_3) \\ G_3 = T_1 R_1 \sin (L_1 - \lambda_1) + T_3 R_3 \sin (L_3 - \lambda_1) + [r_2] \sin (\lambda_1 - l_2) \\ [\rho_1] = \dfrac{G_1}{T_1 \sin (\lambda_1 - \lambda_3)}, \ [\rho_3] = \dfrac{G_3}{T_3 \sin (\lambda_1 - \lambda_3)} \\ \text{Control: } G_1 \tan \beta_1 + G_3 \tan \beta_3 = [\rho_2] \tan \beta_2 \sin (\lambda_1 - \lambda_3) \end{cases}$$

$$(11)\quad \begin{cases} r_1 \cos b_1 \cos (l_1 - L_1) = [\rho_1] \cos (\lambda_1 - L_1) + R_1 \\ r_1 \cos b_1 \sin (l_1 - L_1) = [\rho_1] \sin (\lambda_1 - L_1) \\ r_1 \sin b_1 = [\rho_1] \tan \beta_1 \\ r_3 \cos b_3 \cos (l_3 - L_3) = [\rho_3] \cos (\lambda_3 - L_3) + R_3 \\ r_3 \cos b_3 \sin (l_3 - L_3) = [\rho_3] \sin (\lambda_3 - L_3) \\ r_3 \sin b_3 = [\rho_3] \tan \beta_3 \end{cases}$$

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(12)
$$\begin{cases} \tan i \sin (l_1 - \Omega) = \tan b_1 \\ \tan i \cos (l_1 - \Omega) = \dfrac{\tan b_3 - \tan b_1 \cos (l_3 - l_1)}{\sin (l_3 - l_1)} \\ \text{Controls: } \tan b_2 = \tan i \sin (l_2 - \Omega) \\ \qquad\qquad \tan b_3 = \tan i \sin (l_3 - \Omega) \end{cases}$$

(13)
$$\begin{cases} \sin u_1 = \sec i \cos b_1 \sin (l_1 - \Omega) = \sin b_1 \operatorname{cosec} i \\ \sin u_2 = \sec i \cos b_2 \sin (l_2 - \Omega) = \sin b_2 \operatorname{cosec} i \\ \sin u_3 = \sec i \cos b_3 \sin (l_3 - \Omega) = \sin b_3 \operatorname{cosec} i \\ \text{The latter equalities furnish controls.} \\ \cos u_1 = \cos b_1 \cos (l_1 - \Omega) \\ \cos u_2 = \cos b_2 \cos (l_2 - \Omega) \\ \cos u_3 = \cos b_3 \cos (l_3 - \Omega) \end{cases}$$

(14a)
$$\Delta_1 = \frac{[\rho_1]}{\cos \beta_1}, \quad \Delta_3 = \frac{[\rho_3]}{\cos \beta_3}$$

(14)
$$\begin{cases} \text{For all three indices} \\ \qquad \Delta t = c\Delta \\ \text{where } \log c = 7.76128 \text{ in decimals of a day} \\ \qquad\qquad = 2.69778 \text{ in seconds of time} \\ \qquad t^0 = t - \Delta t \end{cases}$$

(15)
$$\begin{cases} \tau'' = k''(t_3^0 - t_1^0) \text{ where } \log k'' = 3.5500066 \\ W'' = \dfrac{\tau''}{(r_1 r_3)^{3/4}} \\ \quad W'' \text{ is here expressed in seconds of arc. It is approximately equal to } u_3 - u_1 \\ \sqrt{p} = \dfrac{(r_1 r_3)^{1/4} \sin (u_3 - u_1)}{\sin W} \\ O_1 = \dfrac{p}{r_1} - 1, \quad O_3 = \dfrac{p}{r_3} - 1 \\ e \cos v_1 = O_1, \quad e \sin v_1 = \dfrac{O_1 \cos (u_3 - u_1) - O_3}{\sin (u_3 - u_1)} \\ v_2 = v_1 + (u_2 - u_1), \quad v_3 = v_1 + (u_3 - u_1) \\ \text{Control: } e \cos v_3 = O_3 \\ \sin \varphi = e, \quad \Phi = 90^\circ - \varphi, \quad a = p \sec^2 \varphi, \quad \mu'' = \dfrac{k''}{a^{3/2}} \end{cases}$$

(16)
$$\begin{cases} \omega = u_1 - v_1 = u_2 - v_2 = u_3 - v_3 \\ \omega = \text{longitude of perihelion counted from the node.} \\ \qquad \text{For all three places} \\ \dfrac{1}{\sqrt{r}} \sin \dfrac{E}{2} = \dfrac{\sin \frac{v}{2}}{\sqrt{2a \cos \Phi/2}}, \quad \dfrac{1}{\sqrt{r}} \cos \dfrac{E}{2} = \dfrac{\cos \frac{v}{2}}{\sqrt{2a \sin \Phi/2}} \\ \qquad M = E - e'' \sin E \\ \text{where } e'' = [5.3144251]e \\ \quad \text{For any epoch.} \\ \qquad M(E_p) = M + \mu''(E_p - t^0) \end{cases}$$

The values of M_1, M_2, and M_3 should be reduced to the same epoch for comparison.

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The observations of (611), from which the elements were computed, are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
Oct. 11	9 17 29	1 11 56.55	+4 31 9.1	9.459_n	0.704	−1.53	− 7.7
Nov. 2	11 19 54	0 57 34.37	+1 20 41.9	9.129	0.728	−1.65	− 8.8
22	7 46 7	0 50 59.10	−0 26 52.9	9.076_n	0.744	−1.80	−10.4

Corrections were applied for parallax and for aberration time corresponding to distances $\log\Delta_1=0.251297$, $\log\Delta_2=0.262847$, and $\log\Delta_3=0.295851$. These distances were derived from a preliminary computation by FREDERICKSON.

We have then

Berlin Mean Time.	λ	β	L	Log R.
1906	° ′ ″	° ′ ″	° ′ ″	
Oct. 11.62814	18 18 7.8	−2 52 37.6	17 50 22.0	9.999061
Nov. 2.71283	13 45 49.9	−4 26 10.0	39 50 4.0	9.996413
22.56350	11 32 25.2	−5 26 55.8	59 49 3.6	9.994472

		° ′ ″
(1)	ψ	153 34 50.9
(2)	I	21 16 55.6
	K	25 42 54.9
(3)	$(\sin h_2)$	7.457073
(4)	Z_1	8.695724_n
	Z_2	8.943555
	Z_3	9.303041
(5)	τ_1	1.297775
	τ_3	1.344091
	τ	1.622581
	τ_1	9.675194
	τ_3	9.721510
	Q_1	9.382888
	Q_3	9.193813
	Π	8.734054
(6)	E	8.955960
	F	8.915527
	G	8.035852
	a''	9.005288
	c''	7.910158
	h''	0.895054
(6)	A''	+0 42 55.9
	B''	+8 13 41.1
	C''	+8 56 37.0
(7)	$\mathfrak{D}''$	+0 16 24.1
(8)	χ	+9 13 1.1
	r_2	0.440119
	Δ_2	0.262739
	V	7.413697
	Σ_1	0.000274
	Σ_3	0.000173
	T_1	9.676595
	T_3	9.722810
(9)	$[\rho_2]$	0.261436
	l_2	22° 52′ 44″.3
	$\tan b_2$	8.711641_n
	r_2	0.440119
(10)	G_1	8.998619
	G_3	9.087471
	$[\rho_1]$	0.251091
	$[\rho_3]$	0.293728

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We compute here (14a) and (14) in order to make the final correction for aberration time before computing (11) and following.

(14a)	Δ_1	0.251639
	Δ_3	0.295695
(14)	t_1^0	Oct. 11.62813
	t_2^0	Oct. 33.71283
	t_3^0	Oct. 53.56351

The L's and R's remain unchanged.

(11)	$\tan b_1$	8.508158_n
	$\tan b_3$	8.837808_n
	r_1	0.444357
	r_3	0.436440
		° ′ ″
	l_1	18 8 10.0
	l_3	27 13 43.6
		° ′ ″
(12)	i	13 18 11.2
	Ω	190 18 13.0
		° ′ ″
(13)	u_1	188 2 44.4
	u_2	192 54 38.3
	u_3	197 21 50.9
(15)	τ''	5.172588
	W''	9° 1′ 48″.0
	$\sqrt{p}$	0.233739
	O_1	8.737829
(15)	O_3	8.869719
	e	9.132843
		° ′ ″
	v_1	293 44 50.4
	v_2	298 36 44.3
	v_3	303 3 56.9
	φ	7 48 13.9
	Φ	82 11 46.1
	a	0.475558
	μ''	2.836607
	$\sqrt{2a}\sin \Phi/2$	0.206091
	$\sqrt{2a}\cos \Phi/2$	0.265428
(16)	ω	254° 17′ 54″.0
	r_1	0.444358
	r_2	0.440118
	r_3	0.436438
		° ′ ″
	E_1	300 42 6.6
	E_2	305 14 58.4
	E_3	309 22 28.9
	M_1	307 23 28.0
	M_2	311 36 10.2
	M_3	315 23 18.7
	M	311 33 44.0
Nov. 2.5		311 33 44.1
		311 33 44.3

Elements.

Epoch: 1906, November 2.5, Berlin Mean Time.

$$
\begin{aligned}
M &= 311\ 33\ 44.1 \\
\omega &= 254\ 17\ 54.0 \\
\Omega &= 190\ 18\ 13.0 \\
i &= 13\ 18\ 11.2 \\
\varphi &= 7\ 48\ 13.9
\end{aligned}
\Big\} 1906.0
$$

$$\mu = 686''.547$$
$$\log a = 0.475558$$

The residuals (O–C) are

Residuals.		Oct. 11.	Nov. 2.	Nov 22.
O C	α	+0^s.01	−0^s.02	−0^s.02
	δ	0″.0	0″.0	0″.0

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Heliocentric Coordinates 1906.0

$$x = r\,[9.999632]\sin(174\ 19\ 52.1 + v)$$
$$y = r\,[9.992881]\sin(\ 83\ 54\ \ 0.8 + v)$$
$$z = r\,[9.265428]\sin(\ 97\ \ 1\ 27.1 + v)$$

Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1906	h m s	° ′ ″		m s
δ Oct. 11	1 12 1.87	+4 32 24.0	0.251665	14 50
15	1 9 12.06	3 55 1.6	0.251186	14 49
19	1 6 24.08	3 18 19.4	0.251831	14 50
23	1 3 41.76	2 42 49.1	0.253585	14 54
27	1 1 8.32	2 8 59.4	0.256406	15 0
31	0 58 46.74	1 37 15.8	0.260217	15 8
Nov. 4	0 56 39.67	1 8 0.2	0.264968	15 18
8	0 54 49.29	0 41 30.3	0.270559	15 30
12	0 53 17.49	+0 18 0.2	0.276923	15 43
16	0 52 6.02	−0 2 19.3	0.283961	15 59
20	0 51 16.02	0 19 20.0	0.291576	16 16
24	0 50 48.47	0 33 3.0	0.299662	16 34
28	0 50 43.31	0 43 26.2	0.308134	16 54
Dec. 2	0 51 0.66	0 50 35.0	0.316903	17 14
6	0 51 40.17	0 54 35.0	0.325900	17 36
10	0 52 41.52	0 55 33.3	0.335048	17 59
14	0 54 4.28	0 53 36.9	0.344292	18 22
18	0 55 47.84	−0 48 54.8	0.353569	18 46

The observations made at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date.	O–C	
	α	δ		α	δ		α	δ
1906	s	″	1906	s	″	1906	s	″
Oct. 11	−0.04	0.0	Oct. 25	−0.03	−3.3	Nov. 21	+0.14	+ 0.3
12	−0.05	+0.4	25	−0.02	−5.3	22	−0.02	− 0.1
13	−0.18	−1.0	Nov. 2	−0.08	−0.4	Dec. 11	−1.84	− 8.6
14	−0.04	−2.2	13	+0.01	−2.9	12	−2.10	− 8.3
15	−0.06	−1.8	16	+0.35	+0.8	18	−3.37	−16.3

The estimated magnitudes were 12.0 on October 11, 11.8 on October 12, 11.9 on October 13, 11.8 on October 14, and 12.0 on October 25. From these we obtain $m_0 = 12.3$, $g = 8.4$.

An ephemeris for 1908 was computed by FREDERICKSON from these elements.

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Heliocentric Coordinates 1908.0

$$x = r\,[9.999629]\,\sin(174^\circ\,21'\,30''.2 + v)$$
$$y = r\,[9.992880]\,\sin(\,83^\circ\,55'\,34''.5 + v)$$
$$z = r\,[9.265507]\,\sin(\,97^\circ\,\,4'\,59''.8 + v)$$

Ephemeris for 1908.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1908	h m s	° ′		m s
Feb. 4	8 54 33	−0 20.6	0.2411	14 29
8	8 51 27	+0 6.3	0.2420	14 31
12	8 48 28	+0 35.4	0.2441	14 35
16	8 45 39	+1 6.3	0.2472	14 41
20	8 43 3	+1 38.3	0.2514	14 50
24	8 40 43	+2 11.2	0.2565	15 0
28	8 38 41	+2 44.4	0.2625	15 13
Mar. 3	8 37 1	+3 17.4	0.2694	15 27
7	8 35 43	+3 50.0	0.2768	15 43
11	8 34 48	+4 21.8	0.2849	16 1
15	8 34 17	+4 52.3	0.2936	16 20
19	8 34 10	+5 21.4	0.3027	16 41
23	8 34 26	+5 49.0	0.3122	17 3
27	8 35 6	+6 14.7	0.3219	17 26

Observations made at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date.	O–C	
	α	δ		α	δ		α	δ
1908	s	′	1908	s	′	1908	s	′
Feb. 4	−654	+19.6	Feb. 20	−637	+19.0	Mar. 7	−599	+16.7
19	−639	+19.1	Mar. 4	−606	+17.4	24	−552	+14.1
20	−637	+19.0						

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ELEMENTS OF (622) [1906 WP].

By J. C. HAMMOND.

This asteroid was discovered by METCALF at Taunton, Mass., on November 13, 1906. Provisional elements were computed from three observations made at Washington by the method given in TISSERAND'S Leçons sur la Détermination des Orbites.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
Nov. 21	10 45 31	3 51 16.23	+1 31 4.8	9.106_n	0.726	−1.82	−1.7
Dec. 18	12 18 2	3 33 23.59	+3 4 44.0	9.450	0.716	−2.12	−3.7
1907							
Jan. 10	7 20 3	3 35 34.59	+6 30 7.9	9.062_n	0.673	−2.43	−4.6

Elements.

Epoch: 1906, December 18.5, Berlin Mean Time.

$$\begin{aligned} & \quad\ \ ^\circ\ \ '\ \ ''\\ M &= 19\ \ 40\ \ 58.6\\ \omega &= 253\ \ 50\ \ 12.6\\ \Omega &= 142\ \ 21\ \ 39.1\\ i &= \ \ 8\ \ 38\ \ 46.1\\ \varphi &= 14\ \ \ 8\ \ 38.8 \end{aligned} \Bigg\} 1906.0$$

$$\mu = 944''.890$$
$$\log a = 0.383084$$

ω is the longitude of perihelion counted from the node.

The residuals (O–C) for the middle place are $-1''.3$ in α and $-1''.7$ in δ.

Heliocentric Coordinates 1906.0

$$\begin{aligned} x &= r\,[9.998163]\sin(126^\circ\ 30'\ 50''.3+v)\\ y &= r\,[9.981707]\sin(\ 38\ \ 4\ \ 48.8+v)\\ z &= r\,[9.475233]\sin(\ 19\ \ 22\ \ 57.5+v) \end{aligned}$$

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Ephemeris for 1906.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1906	h m s	° ′ ″		m s
δ Nov. 21	3 51 26.31	+1 31 19.8	9.94776	7 22
25	3 47 57.84	1 30 50.5	9.95174	7 26
29	3 44 38.01	1 35 30.1	9.95733	7 32
Dec. 3	3 41 32.69	1 45 15.2	9.96441	7 40
7	3 38 47.29	1 59 54.2	9.97289	7 49
11	3 36 26.16	2 19 11.3	9.98264	7 59
15	3 34 33.15	2 42 45.8	9.99351	8 11
19	3 33 11.31	3 10 13.2	0.00534	8 25
23	3 32 22.33	3 41 7.0	0.01798	8 40
27	3 32 6.96	4 14 55.3	0.03126	8 56
31	3 32 25.15	4 51 11.2	0.04506	9 13
1907				
Jan. 4	3 33 16.39	5 29 26.7	0.05924	9 31
8	3 34 39.69	6 9 18.0	0.07371	9 51
12	3 36 34.12	+6 50 21.5	0.08836	10 11

The asteroid was observed visually at this opposition at Washington only and the observations give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date.	O–C	
	α	δ		α	δ		α	δ
1906	s	″	1906	s	″	1906	s	″
Nov. 21	+0.02	−0.4	Dec. 3	−0.16	−3.4	Dec. 22	−0.19	−3.5
22	+0.06	+1.3	4	−0.08	−4.5	24	−0.20	−4.6
23	−0.07	−2.5	11	−0.21	−4.2	1907		
24	−0.03	−0.3	12	−0.19	−5.1	Jan. 1	−0.09	−0.6
25	−0.06	−3.8	18	−0.18	−2.0	4	−0.02	−1.3
28	−0.14	−4.0				10	−0.01	−1.0

The estimated magnitudes were 11.0 on November 21, 11.2 on November 22, and 12.0 on January 4. From these we obtain $g=10.1$ and $m_0=12.8$.

An ephemeris for 1908 was computed from these elements by FREDERICKSON.

Heliocentric Coordinates for 1908.0

$$x = r\,[9.998164]\,\sin(126\ 32\ 30.2 + v)$$
$$y = r\,[9.981712]\,\sin(\ 38\ \ 6\ 24.2 + v)$$
$$z = r\,[9.475150]\,\sin(\ 19\ 25\ \ 4.6 + v)$$

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Ephemeris for 1908.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1908	h m s	° ′		m s
Mar. 23	13 9 45	+3 9.2	0.2886	16 9
27	13 6 25	3 39.8		
31	13 2 57	4 9.7	0.2872	16 6
Apr. 4	12 59 26	4 38.2		
8	12 55 56	5 5.0	0.2900	16 12
12	12 52 30	5 29.7		
16	12 49 11	5 52.0	0.2968	16 28
20	12 46 3	6 11.7		
24	12 43 7	6 28.6	0.3072	16 52
28	12 40 26	6 42.5		
May 2	12 38 3	6 53.4	0.3206	17 23
6	12 35 58	7 1.3		
10	12 34 13	+7 6.1	0.3364	18 2

Magnitude about 13.9.

Three observations made at Washington give the following corrections to this ephemeris:

Date.	O–C	
	α	δ
1908	s	′
Apr. 3	+19	−1.2
4	+19	−1.2
May 2	+16	−0.9

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ELEMENTS OF (636) [1907 XP].

By ASAPH HALL, jr.

This asteroid was discovered by METCALF at Taunton, Mass., on February 8, 1907. Elements were computed from observations made at Washington using the method of GAUSS as given in his Theoria Motus, translated into English by DAVIS, page 185 et seq.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Red. to 1907.0	
				α	δ
1907	h m s	h m s	° ′ ″	s	″
Feb. 14	10 1 48	9 44 45.42	+24 55 36.7	+0.62	+0.1
Mar. 2	8 12 9	9 31 18.86	+25 35 23.1	+0.50	+0.6
20	7 54 53	9 20 12.52	+25 39 15.0	+0.39	+1.2

Elements.

Epoch: 1907, March 2.5, Berlin Mean Time.

	° ′ ″		° ′ ″
M =	171 51 57.75		
ω =	294 7 53.9	ω =	294 7 56.2
Ω =	35 24 23.5 } 1907.0	Ω =	35 25 11.45 } 1908.0
i =	7 56 27.7	i =	7 56 27.8
φ =	9 57 10.5		

$\mu = 714''.6833$

$\log a = 0.463929$

The residuals (O–C) for the middle place are $\cos\beta\,\Delta\lambda = +2''.1$ and $\Delta\beta = -0''.6$.

Heliocentric Coordinates 1907.0

	° ′ ″
$x = r$ [9.998605] sin	(59 16 40.35 + v)
$y = r$ [9.938265] sin	(331 55 1.4 + v)
$z = r$ [9.702307] sin	(321 21 54.65 + v)

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Ephemeris for 1907.

Berlin Mean Time.	Mean α.	Mean δ.	Log Δ.
1907	h m s	° ′ ″	
Feb. 6.5	9 51 57.29	+24 23 56.8	0.386049
10.5	9 48 27.03	24 40 16.5	0.385680
14.5	9 44 54.12	24 55 6.2	0.386191
18.5	9 41 21.94	25 8 10.9	0.387568
22.5	9 37 53.95	25 19 20.2	0.389788
26.5	9 34 33.30	25 28 23.9	0.392815
Mar. 2.5	9 31 22.86	25 35 18.5	0.396597
6.5	9 28 25.13	25 40 0.6	0.401088
10.5	9 25 42.47	25 42 30.7	0.406222
14.5	9 23 16.96	25 42 49.8	0.411940
18.5	9 21 10.34	25 41 2.2	0.418169
22.5	9 19 23.71	25 37 13.3	0.424838
26.5	9 17 57.92	+25 31 29.5	0.431873

The observations at Washington give the following corrections to the ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date.	O–C	
	α	δ		α	δ		α	δ
1907	s	″	1907	s	″	1907	s	″
Feb. 14	+0.09	−1.0	Feb. 22	−0.08	+0.6	Mar. 11	+0.09	+0.2
15	+0.14	−2.4	Mar. 2	+0.01	−0.6	15	+0.15	+2.5
18	+0.17	−1.9	6	+0.02	−1.3	20	+0.11	−0.6

An ephemeris for 1908 was computed from the above elements.

Heliocentric Coordinates 1908.0

$$x = r\,[9.998603]\ \sin(\ 59\ 17\ 30.5 + v)$$
$$y = r\,[9.938270]\ \sin(331\ 55\ 54.3 + v)$$
$$z = r\,[9.702294]\ \sin(321\ 22\ 34.2 + v)$$

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Ephemeris for 1908.

Berlin Mean Time.	Mean α.	Mean δ.	Log Δ.
1908	h m s	° ′ ″	
Mar. 20.5	13 56 5.44	−8 55 28.6	0.354995
24.5	13 53 39.87	8 47 39.2	0.348524
28.5	13 50 57.91	8 38 50.1	0.342761
Apr. 1.5	13 48 1.61	8 29 5.4	0.337784
5.5	13 44 53.50	8 18 35.5	0.333654
9.5	13 41 36.33	8 7 34.5	0.330418
13.5	13 38 14.31	7 56 17.5	0.328115
17.5	13 34 47.83	7 44 58.9	0.326743
21.5	13 31 22.25	7 33 52.6	0.326331
25.5	13 28 0.07	7 23 14.2	0.326864
29.5	13 24 44.25	7 13 17.9	0.328330
May 3.5	13 21 37.93	7 4 19.6	0.330685
7.5	13 18 43.83	6 56 32.7	0.333880
11.5	13 16 4.19	6 50 8.4	0.337848
15.5	13 13 40.93	−6 45 16.4	0.342517

From the estimated magnitudes $m_0=12.35$ and $g=8.65$. Opposition April 15, magnitude 12.75.

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ELEMENTS OF [1907 YD].

By ETTA M. EATON.

This asteroid was discovered by METCALF at Taunton on March 9, 1907. Elements were computed from three observations made at Washington, using the method given by Dr. W. EBERT. See the discussion of asteroid (611) [1906 VL] by J. C. HAMMOND, on page B 104.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Red. to 1907.0	
				α	δ
1907	h m s	h m s	° ′ ″	s	″
Mar. 16	12 21 28	11 25 20.65	−2 32 20.4	+0.27	−1.2
Apr. 3	11 32 32	11 12 2.66	−1 21 2.2	+0.17	−0.4
20	11 35 58	11 4 38.30	−0 28 36.3	+0.07	+0.6

Elements.

Epoch: 1907, April 3.5, Greenwich Mean Time.

M =	329 53 13.9		
ω =	280 3 56.8	1907.0	280 3 52.3
Ω =	303 26 54.7		303 27 49.5
i =	4 37 56.5		4 37 56.8
φ =	11 48 19.2		

$\mu = 651''.923$

$\log a = 0.490550$

Heliocentric Coordinates 1907.0

$x = r\,[9.999011] \sin(\ 33\ 32\ \ 5.3 + v)$

$y = r\,[9.953863] \sin(301\ 39\ \ 6.0 + v)$

$z = r\,[9.646078] \sin(311\ 23\ 53.5 + v)$

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Ephemeris for 1907.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1907	h m s	° ′ ″	
Mar. 16.5	11 25 31.49	−2 33 7.5	0.210969
20.5	11 22 17.86	2 17 28.1	0.210153
24.5	11 19 10.00	2 1 21.2	0.210506
28.5	11 16 11.87	1 45 11.9	0.211992
Apr. 1.5	11 13 26.62	1 29 22.0	0.214559
5.5	11 10 57.50	1 14 12.8	0.218170
9.5	11 8 46.75	1 0 6.1	0.222677
13.5	11 6 57.23	0 47 19.3	0.228073
17.5	11 5 30.52	0 36 9.3	0.234225
21.5	11 4 27.85	−0 26 49.1	0.241038

The observations at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1907	s	″	1907	s	″
Mar. 16	−0.09	+0.3	Apr. 12	−0.36	−0.1
20	−0.18	+1.6	17	−0.04	−0.7
Apr. 3	−0.26	0.0	20	−0.13	+0.4
11	−0.17	−0.5			

An ephemeris from 1908 was computed from the above elements.

Heliocentric Coordinates 1908.0

$$x = r\,[9.999013]\,\sin(\,33\;32\;59.8 + v)$$
$$y = r\,[9.953860]\,\sin(301\;40\;\;1.5 + v)$$
$$z = r\,[9.646092]\,\sin(311\;24\;42.6 + v)$$

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Ephemeris for 1908.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1908	h m s	° ′ ″	
June 26.5	20 40 30.43	−19 15 10.6	0.274891
30.5	20 38 6.89	19 18 18.6	0.270518
July 4.5	20 35 24.76	19 22 15.7	0.266960
8.5	20 32 26.66	19 26 49.9	0.264293
12.5	20 29 15.61	19 31 49.5	0.262558
16.5	20 25 54.68	19 37 3.4	0.261809
20.5	20 22 27.16	19 42 21.3	0.262076
24.5	20 18 56.76	19 47 31.7	0.263370
28.5	20 15 27.38	19 52 24.5	0.265701
Aug. 1.5	20 12 2.68	19 56 50.9	0.269046
5.5	20 8 46.55	20 0 43.5	0.273373
9.5	20 5 42.14	20 3 56.9	0.278624
13.5	20 2 52.44	20 6 25.9	0.284735
17.5	20 0 19.82	20 8 8.2	0.291624
21.5	19 58 6.12	20 9 3.0	0.299233
25.5	19 56 13.77	−20 9 11.7	0.307461

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ELEMENTS OF (637) [1907 YE].

By ARTHUR SNOW.

This asteroid was discovered by METCALF at Taunton, Mass., on March 11, 1907. Elements were computed from three observations made at Washington, using the method given by WATSON in his Theoretical Astronomy.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ′ ″			s	″
Mar. 20	13 52 21	11 40 17.31	+2 8 40.5	9.368	0.722	+0.27	−1.3
Apr. 9	10 4 22	11 27 21.78	+3 29 26.0	8.452_n	0.705	+0.16	−0.3
16	11 7 13	11 24 14.43	+3 48 35.9	9.193	0.704	+0.12	−0.1

Elements.

Epoch: 1907, April 9.5, Greenwich Mean Time.

M =	8 19 59.3		
ω =	172 25 38.1	1907.0	172 25 44.1
Ω =	357 33 18.3	1907.0	357 34 2.6 1908.0
i =	0 20 6.7	1907.0	0 20 7.2 1908.0
φ =	7 22 8.8		

$\mu = 625''.5773$

$\log a = 0.502484$

The observations at Washington give the following corrections to the ephemeris:

Date.	O–C	
	α	δ
1907	s	″
Mar. 20	−0.03	+0.2
Apr. 9	+0.03	−0.3
16	−0.04	+0.3

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An ephemeris for 1908 was computed from the above elements.

Heliocentric Coordinates 1908.0

$$x = r\,[0.000000]\ \sin\ (259\ 59\ 46.8 + v)$$
$$y = r\,[9.961447]\ \sin\ (169\ 59\ 24.3 + v)$$
$$z = r\,[9.605657]\ \sin\ (170\ \ 1\ 43.1 + v)$$

Ephemeris for 1908.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1908	h m s	° ′ ″	
May 27.5	18 14 53.86	−23 52 58.9	0.347829
31.5	18 12 12.20	23 54 9.1	0.344096
June 4.5	18 9 16.10	23 55 9.1	0.341138
8.5	18 6 8.45	23 55 55.2	0.339002
12.5	18 2 52.24	23 56 24.6	0.337722
16.5	17 59 30.47	23 56 34.6	0.337323
20.5	17 56 6.22	23 56 24.0	0.337823
24.5	17 52 42.77	23 55 53.4	0.339217
28.5	17 49 23.46	23 55 3.7	0.341501
July 2.5	17 46 11.52	23 53 56.3	0.344650
6.5	17 43 10.01	23 52 35.3	0.348618
10.5	17 40 21.69	−23 51 4.4	0.353356

Opposition June 20, 1908, and magnitude 14.0.

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ELEMENTS OF (638) [1907 ZQ].

By ARTHUR SNOW.

This asteroid was discovered by METCALF at Taunton, Mass., on May 5, 1907. Elements were computed from a photographic observation made by METCALF on May 5, and two observations, May 20 and June 15, made at Washington. The method used is that given by WATSON, in his Theoretical Astronomy.

The observations are as follows:

Date.	Place.	Washington Mean Time.	Apparent α.	Apparent δ.	Log pd.		Red. to 1907.0	
					α	δ	α	δ
1907		h m s	h m s	° ′ ″			s	″
May 5	Taunton....	9 55 14	15 38 51.06	−8 13 2.7	.....	.....	....	...
20	Washington.	11 3 4	15 25 49.06	8 3 26.6	8.809_n	0.806	−0.19	−2.6
June 15	Washington.	10 26 48	15 8 20.92	−9 0 4.1	9.013	0.811	−0.47	−1.3

Elements.

Epoch: 1907, May 20.5, Greenwich Mean Time.

	° ′ ″			° ′ ″	
M =	3 30 23.5				
ω =	125 45 8.7	1907.0	ω =	125 45 12.0	1908.0
Ω =	103 37 31.3		Ω =	103 38 18.3	
i =	7 41 31.8		i =	7 41 31.6	
φ =	9 19 44.3				

$\mu = 784''.6983$

$\log a = 0.436869$

The observations at Taunton and Washington give the following corrections to the ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1907	s	″	1907	s	″
May 5	−0.01	−0.2	June 6	−0.22	+1.9
17	+0.20	+0.2	8	−0.19	+0.7
20	−0.01	−0.3	15	+0.04	−0.1

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An ephemeris for 1908 was computed from the above elements.

Heliocentric Coordinates 1908.0

$$x = r\,[9.996296]\,\sin(319\ 30\ 39.1 + v)$$
$$y = r\,[9.968873]\,\sin(232\ 27\ 47.5 + v)$$
$$z = r\,[9.588712]\,\sin(211\ 20\ 50.3 + v)$$

Ephemeris for 1908.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1908	h m s	° ′	
Aug. 28.5	0 14 16	− 9 56.9	0.29471
Sept. 1.5	0 11 39	10 23.7	0.29180
5.5	0 8 48	10 50.6	0.28982
9.5	0 5 47	11 17.0	0.28877
13.5	0 2 38	11 42.6	0.28867
17.5	23 59 23	12 6.8	0.28959
$\mathcal{S}$ 21.5	23 56 5	12 29.4	0.29152
25.5	23 52 49	12 50.1	0.29446
29.5	23 49 38	13 8.4	0.29836
Oct. 3.5	23 46 35	13 24.1	0.30314
7.5	23 43 43	13 37.0	0.30878
11.5	23 41 5	−13 46.9	0.31518

Opposition Sept. 21, 1908, and magnitude 13.9.

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ELEMENTS OF (645) [1907 AG].

By MATT FREDERICKSON.

This asteroid was discovered by METCALF at Taunton, Mass., on September 13, 1907. From three observations made at Washington the following elements were computed by the method given in WATSON'S Theoretical Astronomy:

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ′ ″			s	″
Sept. 29	9 28 16	23 34 24.96	−3 32 35.5	9.268_n	0.769	−1.25	−8.5
Oct. 14	11 7 54	23 24 16.47	−4 6 2.9	9.162	0.774	−1.34	−9.1
30	9 50 50	23 17 38.25	−4 17 6.4	9.116	0.776	−1.45	−9.9

Elements.

Epoch: 1907, September 29.5, Berlin Mean Time.

M =	284 39 33.0	
ω =	89 8 41.6	1907.0
Ω =	0 47 29.7	1907.0
i =	7 4 16.1	1907.0
φ =	8 56 0.6	

$\mu = 620''.253$

$\log a = 0.504958$

$m_0 = 11.5 \qquad g = 9.8$

Residuals.		Sept. 29.	Oct. 14.	Oct. 30.
		″	″	″
O−C	α	+0.1	0.0	0.0
	δ	+0.2	−0.1	0.0

Heliocentric Coordinates 1907.0

$x = r\,[0.000000] \sin (179\ 55\ 49.6 + v)$

$y = r\,[9.935224] \sin (\ 89\ 59\ 16.4 + v)$

$z = r\,[9.705750] \sin (\ 89\ 45\ 54.6 + v)$

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Ephemeris for 1907.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1907	h m s	° ′ ″		m s
Sept. 29	23 34 30.94	−3 32 10.8	0.335317	17 57
Oct. 3	23 31 33.48	−3 42 45.6	0.337299	18 3
7	23 28 45.76	−3 52 16.1	0.340153	18 10
11	23 26 10.39	−4 0 29.5	0.343818	18 20
15	23 23 49.81	−4 7 13.2	0.348241	18 31

Observations made at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date.	O–C	
	α	δ		α	δ		α	δ
1907	s	″	1907	s	″	1907	s	″
Sept. 29	−0.03	−0.2	Oct. 2	+0.01	−0.3	Oct. 9	−0.25	+1.3
29	−0.01	+0.3	5	+0.07	−0.6	12	+0.03	+0.5
30	−0.25	+0.8	8	−0.21	−0.1	14	−0.02	+0.2

Observations made at Washington January 21 and 22, 1909, give corrections of $+1^m50^s$ in right ascension and $-0''.2$ in declination to positions computed from these elements.

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ELEMENTS OF (653) [1907 BK].

By ARTHUR SNOW.

This asteroid was discovered by METCALF at Taunton, Mass., on November 27, 1907. Elements were computed from three observations made at Washington, using the method given by WATSON in his Theoretical Astronomy.

The observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ′ ″			s	″
Dec. 2	11 10 31	4 16 44.31	+5 44 13.1	8.660_n	0.680	−1.67	−2.4
21	8 43 42	4 2 18.52	+6 0 3.3	9.200_n	0.681	−1.87	−3.7
1908							
Jan. 6	9 51 21	3 54 33.22	+6 49 20.5	9.062	0.669	−2.24	−4.9

Elements.

Epoch: 1907, December 21.71407, Greenwich Mean Time.

M = 250 52 2.9			
ω = 49 0 16.2	ω = 49 0 17.7	ω = 49 0 19.2	
Ω = 133 45 32.3	1907.0	Ω = 133 46 21.1	1908.0	Ω = 133 47 9.9	1909.0
i = 11 16 47.5	i = 11 16 47.1	i = 11 16 46.7	
φ = 2 46 34.1			

$\mu = 679''.1475$

$\log a = 0.478695$

Heliocentric Coordinates 1907.0

$x = r\,[9.995622]\sin(273\ 19\ 20.5 + v)$

$y = r\,[9.984043]\sin(185\ 34\ 50.7 + v)$

$z = r\,[9.479061]\sin(156\ 28\ 44.6 + v)$

Heliocentric Coordinates 1908.0

$x = r\,[9.995624]\sin(273\ 20\ 9.3 + v)$

$y = r\,[9.984047]\sin(185\ 35\ 36.4 + v)$

$z = r\,[9.478996]\sin(156\ 29\ 41.2 + v)$

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Ephemeris for 1907–1908.

Greenwich Mean Time	Apparent α.	Apparent δ.	Log Δ.
1907	h m s	° ′ ″.	
Nov. 27.5	4 20 54.19	+5 47 54.6	0.32494
Dec. 1.5	4 17 30.79	5 44 41.5	0.32525
5.5	4 14 9.43	5 43 31.4	0.32650
9.5	4 10 53.64	5 44 29.2	0.32870
13.5	4 7 46.72	5 47 37.5	0.33178
17.5	4 4 51.56	5 52 55.5	0.33570
21.5	4 2 10.70	6 0 20.9	0.34041
25.5	3 59 46.30	6 9 49.8	0.34582
29.5	3 57 40.24	6 21 17.2	0.35188
1908			
Jan. 2.5	3 55 57.30	6 34 46.8	0.35851
6.5	3 54 32.33	+6 49 52.2	0.36563

The observations made at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1907	s	″	1907	s	″
Dec. 2	0.00	−0.1	Dec. 31	−0.07	+1.3
6	−0.13	+0.7	1908		
11	+0.12	−0.6	Jan. 3	−0.01	+1.3
21	−0.01	0.0	6	−0.02	+0.2
25	+0.05	+1.7			

An ephemeris for 1909 was computed from the above elements.

Heliocentric Coordinates 1909.0

° ′ ″

$x = r\,[9.995626] \sin (273\ 20\ 59.6 + v)$
$y = r\,[9.984051] \sin (185\ 36\ 23.8 + v)$
$z = r\,[9.478936] \sin (156\ 30\ 40.9 + v)$

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Ephemeris for 1909.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1909	h m s	° ′	
Jan. 29.5	10 33 18	+13 6.3	0.29490
Feb. 2.5	10 31 6	13 36.9	0.28968
6.5	10 28 37	14 8.7	0.28537
10.5	10 25 55	14 41.3	0.28206
14.5	10 23 3	15 14.1	0.27977
18.5	10 20 4	15 46.7	0.27855
22.5	10 17 2	16 18.7	0.27840
26.5	10 14 0	16 49.6	0.27934
Mar. 2.5	10 11 2	17 18.9	0.28133
6.5	10 8 11	17 46.3	0.28431
10.5	10 5 30	18 11.5	0.28825
14.5	10 3 2	+18 34.3	0.29309

Opposition February 21, 1909, and magnitude 12.5.

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ELEMENTS OF (655) [1907 BF].

By ELEANOR A. LAMSON.

This asteroid was discovered by METCALF at Taunton, Mass., on November 4, 1907. Elements were computed from a photographic position by METCALF on November 4 and two observations at Washington by HAMMOND on November 25 and December 11, 1907. The method used is that given by Dr. W. EBERT in his Eine einfache Methode zur Bestimmung elliptischer Bahnen aus drei Beobachtungen. See the discussion of asteroid (611) [1906 VL] by J. C. HAMMOND, on page B 104.

The observations are as follows:

Date.	Place.	Washington Mean Time.	Apparent α.	Apparent δ.	Log pJ.		Red. to 1907.0	
					α	δ	α	δ
1907		h m s	h m s	° ′ ″			s	″
Nov. 4	Taunton.....	10 52.2	2 45 6.2	+5 19 42.	9.051$_n$	0.719	−1.5	−0.1
25	Washington...	10 56 27	2 29 15.42	+4 28 48.1	8.932	0.695	−1.72	+0.04
Dec. 11	Washington...	10 34 22	2 21 50.92	+4 34 59.1	9.250	0.697	−1.90	+0.09

Elements.

Epoch: 1907, December 11.5, Greenwich Mean Time.

	° ′ ″			° ′ ″	
M =	359 30 14.8				
ω =	279 15 7.7	1907.0	ω =	279 15 13.5	1909.0
Ω =	130 35 4.2		Ω =	130 36 38.9	
i =	6 29 30.2		i =	6 29 29.5	
φ =	4 51 28.0				

$\mu = 650''.067$

$\log a = 0.475592$

The residuals (O–C) for the middle place are $\cos\beta\Delta\lambda = -0''.1$ and $\Delta\beta = +0''.4$.

Heliocentric Coordinates 1907.0

	°	′	″
$x = r$ [9.998392] sin (	140	1	7.7 + v)
$y = r$ [9.975292] sin (	51	43	59.4 + v)
$z = r$ [9.530194] sin (	36	10	51.9 + v)

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Ephemeris for 1907.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1907	h m s	° ′ ″	
Nov. 2.5	2 46 51.61	+5 27 58.2	0.244870
$\mathcal{S}$ 6.5	2 43 35.45	5 13 2.4	0.245182
10.5	2 40 20.40	4 59 46.6	0.246602
14.5	2 37 10.29	4 48 27.2	0.249267
18.5	2 34 8.77	4 39 17.8	0.252661
22.5	2 31 19.11	4 32 28.7	0.257185
26.5	2 28 44.14	4 28 7.9	0.262625
30.5	2 26 26.45	4 26 19.8	0.268897
Dec. 4.5	2 24 28.16	4 27 7.8	0.275918
8.5	2 22 51.26	+4 30 31.7	0.283584

The observations made at Taunton and Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C		Date.	O–C	
	α	δ		α	δ		α	δ
1907	s	″	1907	s	″	1907	s	″
Nov. 4	+0.19	−2	Nov. 14	−0.01	−2.4	Dec. 2	+0.04	−1.9
13	+0.11	+1.2	25	+0.05	−2.1	8	+0.13	0.0
13	+0.08	+0.2	29	−0.15	−1.4	11	−0.06	−1.3

An ephemeris for 1909 was computed from the above elements.

Heliocentric Coordinates 1909.0

$$x = r\,[9.998393]\ \sin\ (140\ 2\ 48.5 + v)$$
$$y = r\,[9.975299]\ \sin\ (\ 51\ 45\ 36.6 + v)$$
$$z = r\,[9.530135]\ \sin\ (\ 36\ 12\ 46.4 + v)$$

Ephemeris for 1909.

Greenwich Mean Time.	Apparent α.	Apparent δ.	Log Δ.
1909	h m s	° ′ ″	
$\mathcal{S}$ Feb. 24.5	9 20 12.22	+17 44 26.0	0.307229
28.5	9 17 27.93	18 3 18.1	0.312099
Mar. 4.5	9 14 59.21	18 20 23.4	0.317792
8.5	9 12 48.19	18 35 34.5	0.324219
12.5	9 10 56.51	18 48 47.6	0.331298
16.5	9 9 25.67	18 59 59.5	0.338945
20.5	9 8 16.67	19 9 8.8	0.347078
24.5	9 7 30.26	19 16 15.4	0.355613
28.5	9 7 6.76	+19 21 22.8	0.364468

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ELEMENTS OF (660) [1908 CC].

By MATT FREDERICKSON.

This asteroid was discovered by METCALF at Taunton, Mass., on January 8, 1908. From three observations made at Washington, elements were computed using the method given by WATSON in his Theoretical Astronomy.

These observations are as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1908.0	
				α	δ	α	δ
1908	h m s	h m s	° ′ ″			s	″
Jan. 12	12 2 6	8 13 51.34	+ 5 17 9.0	8.967_n	0.686	+0.92	−1.1
29	10 52 7	7 58 20.04	+ 7 12 48.6	8.836_n	0.663	+0.76	−0.4
Mar. 24	8 36 38	7 39 45.43	+14 13 16.8	9.123	0.570	+0.39	0.0

Provisional Elements.

Epoch: 1908, January 12.5, Berlin Mean Time.

M	= 221 11 40.9	
ω	= 108 10 53.4	1908.0
Ω	= 156 31 5.7	1908.0
i	= 15 17 23.1	1908.0
φ	= 5 52 6.4	

$\mu = 876''.840$

$\log a = 0.404725$

The middle place computed from these elements gave rather large residuals, hence n and n'', according to the notation of WATSON, were computed from the approximate elements and the geocentric distances recomputed. From these geocentric distances new elements were determined which represented the middle place satisfactorily.

The corrected elements are as follows:

Corrected Elements.

Epoch: 1908, January 12.5, Berlin Mean Time.

M	= 221 57 35.9	
ω	= 107 23 10.3	1908.0
Ω	= 156 37 21.5	1908.0
i	= 15 14 23.6	1908.0
φ	= 5 52 48.2	

$\mu = 877''.992$

$\log a = 0.404344$

$m_0 = 10.6 \qquad g = 7.6$

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Heliocentric Coordinates 1908.0

$$x = r\,[9.997625]\ \sin\ (354\ 44\ 48.2 + v)$$
$$y = r\,[9.994180]\ \sin\ (265\ 44\ 13.5 + v)$$
$$z = r\,[9.285993]\ \sin\ (232\ 33\ 54.8 + v)$$

Ephemeris for 1908.

Berlin Mean Midnight.	Apparent α.	Apparent δ.	Log Δ.	Aberr. Time.
1908	h m s	° ′ ″		m s
Jan. 12	8 14 4.02	+ 5 15 51.1	0.253726	14 54
16	8 10 29.34	5 39 9.7		14 48
20	8 6 48.67	6 5 5.0	0.248264	14 43
24	8 3 5.83	6 33 18.9		14 40
28	7 59 24.97	7 3 30.9	0.246324	14 40
Feb. 1	7 55 50.31	7 35 19.4		14 43
29	7 38 33.80	11 29 17.4	0.284605	16 9
Mar. 4	7 37 39.46	12 0 18.6		16 27
8	7 37 11.88	12 29 59.5	0.301040	16 47
12	7 37 11.05	12 58 10.7		17 7
16	7 37 36.49	13 24 44.5	0.318798	17 29
20	7 38 27.48	13 49 36.6		17 51
24	7 39 43.17	+14 12 43.3	0.337240	18 15

The observations made at Washington give the following corrections to this ephemeris:

Corrections to the Ephemeris.

Date.	O–C		Date.	O–C	
	α	δ		α	δ
1903	s	″	1908	s	″
Jan. 12	+0.04	+0.7	Mar. 7	+0.05	+0.6
14	+0.18	−0.2	10	+0.03	+1.1
19	−0.20	−0.3	21	+0.13	+4.5
24	+0.03	+0.5	24	+0.26	+3.3
29	−0.17	+0.1	24	+0.17	+2.8

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ELEMENTS OF [1908 EJ].

By MATT FREDERICKSON.

This asteroid was discovered by METCALF at Taunton, Mass., on September 30, 1908. From two visual observations made at Washington and one photographic observation made at Taunton, an orbit was computed using the method given by WATSON in his Theoretical Astronomy.

The observations are as follows:

Date.	Place.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1908.0	
					α	δ	α	δ
1908		h m s	h m s	° ′ ″			s	″
Oct. 4	Washington....	12 26 48	1 2 53.07	+4 20 12.1	8.553	0.696	−1.25	− 8.0
16	Washington....	10 56 10	0 50 12.59	+4 4 43.2	8.415_n	0.699	−1.32	− 8.6
Nov. 15	Taunton.....	8 53 44	0 29 6.94	+4 22 40.0	8.720	0.727	−1.56	−10.2

Elements.

Epoch: 1908, October 4.5, Berlin Mean Time.

	° ′ ″	
M =	318 30 40.1	
ω =	42 2 43.9	1908.0
Ω =	22 20 45.4	1908.0
i =	8 13 53.8	1908.0
φ =	6 9 15.2	

$\mu = 969''.054$

$\log a = 0.375773$

$m_0 = 11.3 \qquad g = 8.7$

Heliocentric Coordinates 1908.0

	° ′ ″
$x = r\,[9.999356] \sin$	(154 11 1.0 + v)
$y = r\,[9.932970] \sin$	(66 3 44.0 + v)
$z = r\,[9.714516] \sin$	(59 1 18.0 + v)

The residuals for the middle place are:

Residuals.	O−C	
	α	δ
1908	s	″
Oct. 16	−0.13	−2.4

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ORBITS OF COMETS.

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ELEMENTS OF COMET 1903 I.

By H. R. MORGAN and ELEANOR A. LAMSON.

This comet was discovered by GIACOBINI at Nice, France, on January 15, 1903. Elements were computed from observations January 19 at Nice, and January 21 and 23 at Washington, using the method of THEODOR R. v. OPPOLZER as given in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1903.0	
					α	δ
1903		h m s	h m s	° ′ ″	s	″
Jan. 19	Nice	5 59 43	22 57 48	+2 16 24	−0.6	+6
21	Washington	11 47 47	23 0 6.8	+2 47 44	−0.6	+6
23	Washington	11 41 59	23 1 10.9	+3 2 8	−0.6	+6

Elements.

T = 1903, April 6.4289, Greenwich Mean Time.

	° ′ ″	
ω =	128 18 43	1903.0
Ω =	359 39 10	1903.0
i =	37 36 38	1903.0
q =	0.5266	

Elements were also computed from the following observations made at Washington January 21, 22, 23, 30, and February 5, 6. The first three dates were combined to form a normal place; the fourth date was used as the middle place; and the last two dates were united in a normal.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1903.0	
				α	δ	α	δ
1903	h m s	h m s	° ′ ″			s	″
Jan. 21	6 39 31	23 0 6.83	+2 47 44.2	9.574	0.724	−0.64	−6.2
22	6 33 43	23 1 10.86	+3 2 7.8	9.570	0.722	−0.64	−6.1
23	6 51 4	23 2 17.39	+3 16 54.8	9.595	0.723	−0.66	−6.3
30	6 46 22	23 10 41.65	+5 7 13.5	9.611	0.716	−0.74	−6.3
Feb. 5	6 46 29	23 18 53.17	+6 53 3.1	9.627	0.711	−0.78	−6.3
6	6 40 54	23 20 21.01	+7 11 40.9	9.624	0.708	−0.81	−6.2

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Elements.

T = 1903, March 15.4644, Greenwich Mean Time.

ω =	133 44 44	1903.0
Ω =	2 21 6	
i =	30 40 20	
q =	0.40920	

The residuals (O–C) to the middle place are $\cos\beta\Delta\lambda = +1''.6$ and $\Delta\beta = -1''.5$.

Heliocentric Coordinates 1903.0

$$x = r\,[9.999905]\sin(225\ 46\ 7 + v)$$
$$y = r\,[9.768323]\sin(137\ 25\ 31 + v)$$
$$z = r\,[9.908572]\sin(134\ 54\ 2 + v)$$

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ELEMENTS OF COMET 1903 II.

By H. R. MORGAN and C. W. FREDERICK.

This comet was discovered by GIACOBINI at Nice, France, on December 2, 1902. Elements were computed from three normal places formed from observations made at Washington and Lick. The method used is that given by OPPOLZER in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1902.0	
					α	δ
1902		h m s	h m s	° ′ ″	s	″
Dec. 3	Washington	17 39 16	7 17 24.81	−1 50 3.4	−3.18	+15.5
5	Washington	18 50 27	7 16 49.46	−1 32 48.3	−3.20	+15.3
5	Lick	23 38 7	7 16 45.7	−1 31 2	−3.20	+15.3
6	Lick	19 1 55	7 16 30.7	−1 23 49	−3.21	+15.3
7	Lick	19 39 39	7 16 9.8	−1 14 30	−3.21	+15.4
7	Washington	16 58 31	7 16 12.05	−1 15 29.5	−3.21	+15.4
8	Washington	17 26 44	7 15 50.50	−1 5 58.5	−3.22	+15.4
9	Washington	16 24 7	7 15 29.04	−0 56 41.7	−3.23	+15.4

Elements.

T = 1903, April 1.7863, Greenwich Mean Time.

	° ′ ″	
ω =	9 47 7	1902.0
Ω =	117 12 35	
i =	43 53 29	
q =	2.6861	

The residuals (O–C) to the middle place are $\cos\beta\Delta\lambda = -5''$ and $\Delta\beta = +3''$.

Heliocentric Coordinates 1902.0

	° ′ ″
$x = r$ [9.89614] sin	(225 17 27 + v)
$y = r$ [0.00000] sin	(135 6 38 + v)
$z = r$ [9.78999] sin	(44 49 2 + v)

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ELEMENTS OF COMET 1903 IV.

By H. R. MORGAN and ELEANOR A. LAMSON.

This comet was discovered by BORRELLY at Marseille, France, on June 21, 1903. Elements were computed from three normal places formed from observations made at Lick and Washington. The method used is that given by OPPOLZER in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1903.0	
					α	δ
1903		h m s	h m s	° ′ ″	s	″
June 22	Lick	20 58 51	21 51 38.8	− 7 0 48	−1.7	−15
23	Lick	19 52 2	21 50 51.4	− 6 9 26	−1.7	−15
24	Lick	20 59 17	21 49 52.0	− 5 8 48	−1.7	−15
30	Washington	20 1 33	21 40 53.07	+ 2 33 58.7	−1.6	−15
July 1	Washington	20 13 24	21 38 35.79	+ 4 19 22.1	−1.8	−15
2	Washington	20 7 44	21 36 1.35	+ 6 13 58.6	−1.8	−15
7	Washington	19 48 24	21 16 21.76	+19 15 39.7	−1.8	−15
7	Washington	20 10 41	21 16 16.62	+19 18 45.8	−1.8	−15
8	Washington	20 6 7	21 10 16.45	+22 48 7.2	−1.8	−15
9	Washington	19 36 51	21 3 20.32	+26 34 4.3	−1.8	−15

Elements.

$T = 1903$, August 27.6041, Greenwich Mean Time.

	° ′ ″	
ω	= 127 19 41	1903.0
Ω	= 293 32 53	
i	= 84 59 50	
q	= 2.1363	

The residuals (O–C) to the middle place are $\cos\beta\Delta\lambda = +3''.7$ and $\Delta\beta = +2''.1$.

Heliocentric Coordinates 1903.0

	° ′ ″
$x = r$ [9.61006] sin	(206 0 46 + v)
$y = r$ [9.96218] sin	(13 53 44 + v)
$z = r$ [9.99866] sin	(105 51 40 + v)

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ELEMENTS OF COMET 1905 II.

By H. R. MORGAN and ELEANOR A. LAMSON.

This comet was discovered by BORRELLY at Marseille, France, on December 29, 1904. Elements were computed from the following three observations made at Washington, using the method of OPPOLZER as given in Bahnbestimmung der Kometen und Planeten.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Red. to 1905.0	
				α	δ
1904	h m s	h m s	° ′ ″	s	″
Dec. 30	10 44 58	1 15 14.2	−8 56 48	+0.4	+5
31	7 54 20	1 16 22.4	−8 13 30	+0.4	+5
1905					
Jan. 1	7 12 44	1 17 38.7	−7 25 45	+0.4	+5

Elements.

T = 1905, January 13.4747, Greenwich Mean Time.

$$\left.\begin{aligned} \omega &= 349\ 59\ 8 \\ \Omega &= 72\ 57\ 7 \\ i &= 32\ 47\ 27 \end{aligned}\right\} 1905.0$$

$$q = 1.4899$$

Heliocentric Coordinates 1905.0

$$x = r\,[9.93222]\ \sin\ (149\ 56\ 41 + v)$$
$$y = r\,[9.94307]\ \sin\ (\ 79\ 17\ 44 + v)$$
$$z = r\,[9.84892]\ \sin\ (\ 22\ 36\ 13 + v)$$

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ELEMENTS OF COMET 1905 III.

By H. R. MORGAN and ELEANOR A. LAMSON.

This comet was discovered by GIACOBINI at Nice, France, on March 26, 1905. Elements were computed from three observations, March 26 at Nice, March 27 at Lick, and March 28 at Washington. The method used is that given in Bahnbestimmung der Kometen und Planeten, by THEODOR R. v. OPPOLZER.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1905.0	
					α	δ
1905		h m s	h m s	° ′ ″	s	″
Mar. 26	Nice	7 42 32	5 44 14.0	+10 56 56	−0.3	+8
27	Lick	16 3 39	5 48 54.8	+12 35 43	−0.3	+8
28	Washington	12 56 34	5 52 0.5	+13 39 30	−0.3	+8

Elements.

$T = 1905$, April 3.5723, Greenwich Mean Time.

ω	= 357 12 52	1905.0
Ω	= 154 8 10	
i	= 42 58 42	
q	= 1.1508	

Elements were also computed by ELEANOR A. LAMSON from the following observations made at Washington.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1905.0	
				α	δ	α	δ
1905	h m s	h m s	° ′ ″			s	″
Mar. 28	7 48 18	5 52 0.12	+13 39 41.5	9.429	0.604	−0.35	+8.0
31	7 46 44	6 3 6.17	+17 19 8.0	9.435	0.553	−0.37	+8.1
Apr. 3	8 39 41	6 15 3.38	+20 58 42.0	9.560	0.543	−0.38	+8.2

Elements.

$T = 1905$, April 4.04783, Greenwich Mean Time.

ω	= 358 12 25.6	1905.0
Ω	= 157 7 9.9	
i	= 40 23 51.9	
q	= 1.11784	

The residuals (O–C) for the middle place are $\cos\beta\,\Delta\lambda = -5''.3$ and $\Delta\beta = +0''.3$.

Heliocentric Coordinates 1905.0

$$x = r\,[9.985755]\sin(250\ 23\ 24.2 + v)$$
$$y = r\,[9.986593]\sin(156\ 37\ 20.4 + v)$$
$$z = r\,[9.545605]\sin(\ 24\ 20\ 44.7 + v)$$

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ELEMENTS OF COMET 1905 V.

By ELEANOR A. LAMSON.

This comet was discovered by SCHAER at Geneva, Switzerland, on November 17, 1905. Elements were computed from the following three observations made at Washington, using the method given in Bahnbestimmung der Kometen und Planeten, by THEODOR R. v. OPPOLZER.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1905.0	
				α	δ	α	δ
1905	h m s	h m s	° ′ ″			s	″
Nov. 21	6 14 46	23 46 14.76	+52 53 28.7	9.464_n	0.238_n	−2.68	−13.7
23	10 39 34	23 37 39.65	+35 48 47.2	9.622	0.248	−2.38	−14.1
26	9 56 19	23 32 54.65	+19 13 36.8	9.504	0.543	−2.24	−14.4

Elements.

T = 1905, October 25.7345, Greenwich Mean Time.

	° ′ ″	
ω =	132 39 47	1905.0
Ω =	222 55 38	
i =	140 36 10	
q =	1.0520	

The residuals (O–C) for the middle place are $\cos\beta\,\Delta\lambda = +2''$ and $\Delta\beta = +2''$.

Heliocentric Coordinates 1905.0

	° ′ ″
$x = r$ [9.95508] sin (	6 57 19 + v)
$y = r$ [9.83204] sin (	65 45 47 + v)
$z = r$ [9.93030] sin (114	6 26 + v)

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ELEMENTS OF COMET 1905 VI.

By ELEANOR A. LAMSON.

This comet was discovered by BROOKS at Geneva, N. Y., January 26, 1906. Elements were computed from observations made on January 27, 28, at Lick, and January 29 at Washington. The method used is that given by OPPOLZER in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1906.0	
					α	δ
1906		h m s	h m s	° ′ ″	s	″
Jan. 27	Lick	21 24 29	16 18 49.7	+48 51 15	+0.4	−8
28	Lick	23 2 7	16 17 57.4	+50 37 12	+0.4	−8
29	Washington	15 21 17	16 17 5.8	+52 8 30	+0.4	−8

Elements.

T = 1905, December 24.4995, Greenwich Mean Time.

ω =	92 36 56	1906.0
Ω =	287 16 20	
i =	126 4 30	
q =	1.3050	

Elements were also computed from the following observations made at Washington, January 29, 31, February 1, 3. The observations of January 29 and February 3 were used directly, while the middle place, equidistant from these dates, was a normal derived from all four observations.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
Jan. 29	15 21 17	16 17 5.76	+52 8 29.6	9.830_n	0.046	+0.44	−7.5
31	16 24 13	16 14 33.25	+55 46 31.9	9.773_n	9.892_n	+0.46	−7.5
Feb. 1	15 53 50	16 12 59.52	+57 35 12.4	9.834_n	9.719_n	+0.47	−7.4
3	16 9 38	16 8 48.10	+61 26 31.7	9.839_n	0.188_n	+0.49	−7.4

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Elements.

$T = 1905$, December 21.98542, Greenwich Mean Time.

	°	′	″	
$\omega =$	89	29	20.9	1906.0
$\Omega =$	286	18	37.4	
$i =$	126	28	42.0	
$q =$	1.29432			

The residuals (O–C) for the middle place are $\cos\beta\,\Delta\lambda = -0''.5$ and $\Delta\beta = -1''.3$.

Heliocentric Coordinates 1906.0

$$x = r\,[9.803432]\sin(243\ 16\ 59.4 + v)$$
$$y = r\,[9.999813]\sin(331\ 14\ 6.5 + v)$$
$$z = r\,[9.887776]\sin(59\ 50\ 49.5 + v)$$

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ELEMENTS OF COMET 1906 II.

By ELEANOR A. LAMSON.

This comet was discovered by Ross at Melbourne, Australia, March 17, 1906. Elements were computed from three observations, March 19 at Glasgow, Mo., March 20 and 21 at Washington. The method used is that given by OPPOLZER in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1906.0	
					α	δ
1906		h m s	h m s	° ′ ″	s	″
Mar. 19	Glasgow.....	13 52 11	2 9 31.4	−5 47 25	+0.1	+4
20	Washington.....	12 25 55	2 12 36.0	−4 44 58	+0.1	+4
21	Washington.....	12 29 58	2 15 47.2	−3 39 39	0.0	+4

Elements.

T = 1906, February 21.4710, Greenwich Mean Time.

	° ′ ″	
ω =	278 43 8	1906.0
Ω =	72 50 59	
i =	81 26 56	

q = 0.7427

Elements were also computed from the following observations made March 19 at Glasgow, March 23 and April 2 at Washington.

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
					α	δ	α	δ
1906		h m s	h m s	° ′ ″			s	″
Mar. 19	Glasgow.....	13 52 11	2 9 31.4	−5 47 25	9.65	0.75	+0.1	+4
23	Washington....	12 34 43	2 21 53.36	−1 33 50.1	9.648	0.743	+0.03	+3.7
Apr. 2	Washington....	12 52 49	2 48 19.65	+7 31 57.3	9.662	0.730	−0.08	+4.2

Elements.

T = 1906, February 20.93326, Greenwich Mean Time.

	° ′ ″	
ω =	276 27 7.1	1906.0
Ω =	72 2 28.1	
i =	83 27 32.1	

q = 5.28340

The residuals (O–C) for the middle place are $\cos\beta\,\Delta\lambda = +4''.8$ and $\Delta\beta = +1''.5$.

Heliocentric Coordinates 1906.0

	° ′ ″
$x = r$ [9.514312] sin (	25 48 58.7 + v)
$y = r$ [9.975545] sin (	29 2 44.8 + v)
$z = r$ [9.999934] sin (298	42 5.1 + v)

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ELEMENTS OF COMET 1906 VII.

By ELEANOR A. LAMSON.

This comet was discovered by THIELE at Copenhagen, Denmark, on November 10, 1906. Elements were computed from observations, November 10 at Copenhagen and November 12 and 15 at Washington. OPPOLZER'S method as given in Bahnbestimmung der Kometen and Planeten was used in the computation.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1906.0	
					α	δ
1906		h m s	h m s	° ′ ″	s	″
Nov. 10	Copenhagen	12 12 40	9 15 21.3	+12 16 50	−1.9	+12
12	Washington	20 23 16	9 25 33.1	+15 4 4	−1.8	+12
15	Washington	21 36 2	9 39 47.4	+18 55 51	−1.8	+12

Elements.

$T = 1906$, November 21.2972, Greenwich Mean Time.

	° ′ ″	
$\omega =$	8 43 2	1906.0
$\Omega =$	84 56 14	1906.0
$i =$	56 32 39	1906.0
$q =$	1.2146	

Elements were also computed from later observations at Washington, as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1906.0	
				α	δ	α	δ
1906	h m s	h m s	° ′ ″			s	″
Nov. 15	16 27 46	9 39 47.36	+18 55 50.5	9.284_n	0.500	−1.78	+12.5
29	15 57 18	11 2 18.44	+38 6 31.3	9.553_n	9.995	−1.73	+13.2
Dec. 18	15 30 56	13 35 49.53	+55 40 30.1	9.863_n	9.803	−1.03	+10.2

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Elements.

T = 1906, November 21.30030, Greenwich Mean Time.

	°	′	″			°	′	″	
ω =	8	43	1.5	1906.0	ω =	8	43	2.1	1907.0
Ω =	84	56	59.8		Ω =	84	57	49.7	
i =	56	34	15.7		i =	56	34	15.7	
q = 1.21480									

The residuals (O–C) for the middle place are, cos $\beta\Delta\lambda = +2''.3$ and $\Delta\beta = -2''.3$.

Heliocentric Coordinates 1906.0	*Heliocentric Coordinates 1907.0*
$x = r$ [9.744903] sin (179 36 14.5 + v)	$x = r$ [9.744881] sin (179 37 44.2 + v)
$y = r$ [9.981382] sin (116 11 22.1 + v)	$y = r$ [9.981408] sin (116 11 46.2 + v)
$z = r$ [9.944165] sin (35 30 47.3 + v)	$z = r$ [9.944144] sin (35 30 54.6 + v)

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ELEMENTS OF COMET 1907a.

By ELEANOR A. LAMSON.

This comet was discovered by GIACOBINI at Nice, France, on March 9, 1907. Elements were computed from three observations March 9 at Nice, March 11 at Washington, and March 12 at Lick. The method used is that given by OPPOLZER in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1907.0	
					α	δ
1907		h m s	h m s	° ′ ″	s	″
Mar. 9	Nice	9 41 46	7 4 31.4	−18 21 17	+0.3	+3
11	Washington	7 47 56	6 58 23.0	−16 19 50	+0.2	+4
12	Lick	17 10 2	6 55 14.2	−15 14 44	+0.3	+3

Elements.

T = 1907, March 8.8306, Greenwich Mean Time.

ω =	311 11 17	1907.0
Ω =	95 54 10	
i =	142 28 30	
q =	2.0483	

Elements were also computed from the following observations made March 9 at Nice, and March 13 and 17 at Washington:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1907.0	
					α	δ	α	δ
1907		h m s	h m s	° ′ ″			s	″
Mar. 9	Nice	9 41 46	7 4 31.4	−18 21 17	8.00	0.85	+0.3	+3.0
13	Washington	12 48 44	6 53 8.72	−14 30 1.1	8.282	0.847	+0.25	+3.4
17	Washington	13 50 7	6 43 52.56	−10 59 33.9	9.277	0.819	+0.24	+3.6

Elements.

T = 1907, March 17.66092, Greenwich Mean Time.

ω =	316 16 39.6	1907.0
Ω =	97 0 15.4	
i =	141 46 50.5	
q =	2.05116	

The residuals (O–C) for the middle place are $\cos\beta\Delta\lambda = +5''.4$ and $\Delta\beta = -1''.6$.

Heliocentric Coordinates 1907.0

$$x = r\,[9.897220]\sin(307\ 23\ 22.9 + v)$$
$$y = r\,[9.965773]\sin(\ 56\ \ 8\ 29.2 + v)$$
$$z = r\,[9.859208]\sin(349\ 23\ 16.1 + v)$$

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ELEMENTS OF COMET 1907a.

By H. R. MORGAN.

Elements were computed from observations made March 9 at Nicé, March 11 and 13 at Washington. The method used is that given by OPPOLZER, in Bahnbestimmung der Kometen und Planeten.

The observations are as follows:

Date.	Place.	Greenwich Mean Time.	Apparent α.	Apparent δ.	Red. to 1907.0	
					α	δ
1907		h m s	h m s	° ′ ″	s	″
Mar. 9	Nice.....	9 41 46	7 4 31.4	−18 21 17	+0.3	+3
11	Washington.....	7 47 56	6 58 23.0	−16 19 50	+0.2	+4
13	Washington.....	12 48 44	6 53 8.7	−14 30 1	+0.2	+3

Elements.

$T = 1907$, March 13.6196, Greenwich Mean Time.

	°	′	″	
ω =	314	2	19	1907.0
Ω =	96	36	33	
i =	142	1	58	
q =	2.0510			

The residuals (O–C) for the middle place are $\cos\beta\Delta\lambda = -11''$ and $\Delta\beta = +2''$.

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ELEMENTS OF COMET 1907 b.

By ELEANOR A. LAMSON and C. W. FREDERICK.

This comet was discovered by MELLISH at Madison, Wis., on April 14, 1907. Elements were computed from the three following observations made at Washington, using the method of OPPOLZER, as given in Bahnbestimmung der Kometen und Planeten.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Red. to 1907.0	
				α	δ
1907	h m s	h m s	° ′ ″	s	″
Apr. 15	8 42 37	6 52 32.4	+13 33 46	+0.1	+4
16	8 41 2	7 2 53.5	+18 32 44	+0.1	+4
17	9 0 29	7 12 13.8	+22 47 7	+0.2	+4

Elements.

$T = 1907$, March 27.5642, Greenwich Mean Time.

	° ′ ″	
ω	328 46 57	1907.0
Ω	189 7 23	
i	110 11 55	
q	0.9240	

The residuals (O–C) for the middle place are $\cos\beta\Delta\lambda = +2''$ and $\Delta\beta = +1''$.

Heliocentric Coordinates 1907.0

$$x = r\,[9.99514]\,\sin(235\ 36\ 32 + v)$$
$$y = r\,[9.19765]\,\sin(216\ 6\ 54 + v)$$
$$z = r\,[9.99941]\,\sin(325\ 9\ 35 + v)$$

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ELEMENTS OF COMET 1907e.

By ELEANOR A. LAMSON.

This comet was discovered by MELLISH at Madison, Wis., on October 13, 1907. Elements were computed from the three following observations made at Washington, using the method of OPPOLZER, as given in Bahnbestimmung der Kometen und Planeten.

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Red. to 1907.0	
				α	δ
1907	h m s	h m s	° ′ ″	s	″
Oct. 15	16 51 33	8 25 33.4	−8 39 25	−1.1	+7
16	16 42 30	8 22 37.5	−8 13 52	−1.1	+7
17	16 19 16	8 19 32.3	−7 47 1	−1.3	+7

Elements.

$T = 1907$, September 12.4693, Greenwich Mean Time.

ω	= 291 42 22	
Ω	= 55 32 9	1907.0
i	= 118 53 3	
q	= 0.9734	

Elements were also computed from other observations at Washington, as follows:

Date.	Washington Mean Time.	Apparent α.	Apparent δ.	Log $p\Delta$.		Red. to 1907.0	
				α	δ	α	δ
1907	h m s	h m s	° ′ ″			s	″
Oct. 15	16 51 33	8 25 33.39	−8 39 25.2	9.360_n	0.801	−1.29	+7.3
18	16 13 53	8 16 12.27	−7 18 5.1	9.410_n	0.789	−1.32	+7.0
21	17 12 26	8 4 32.20	−5 36 44.3	9.025_n	0.787	−1.35	+6.8

Elements.

$T = 1907$, September 14.87225, Greenwich Mean Time.

ω	= 295 5 48.6	
Ω	= 54 22 2.7	1907.0
i	= 119 46 53.9	
q	= 0.98545	

The residuals (O–C) for the middle place are $\cos\beta\Delta\lambda = -0'.3$ and $\Delta\beta = 0'.0$.

Heliocentric Coordinates 1907.0

$$x = r\,[9.850515]\sin(350\ 22\ 37.5 + v)$$
$$y = r\,[9.984040]\sin(\ 64\ 25\ 25.1 + v)$$
$$z = r\,[9.877361]\sin(320\ 30\ 3.4 + v)$$

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APPENDIX II.

MISCELLANEOUS REPORTS

ON THE

TRANSIT OF MERCURY

OF

NOVEMBER 10, 1894.

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PREFACE.

The reports contained in this appendix were received at the Observatory in response to the request contained in the circular Instructions for Observing the Transit of Mercury, November 10, 1894, issued by the Observatory in order that as many observations as possible of this transit might be procured. This circular is reprinted on pages C 7 to C 10.

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INSTRUCTIONS FOR OBSERVING THE TRANSIT OF MERCURY,

NOVEMBER 10, 1894.

ISSUED BY THE UNITED STATES NAVAL OBSERVATORY.

The attention of astronomical observers is invited to the transit of Mercury over the disk of the Sun, which will occur on November 10, 1894, and will be visible throughout the United States. Its accurate observation is of great importance, partly for the sake of improving the elements of Mercury, and partly because it is one of the few phenomena available for testing the uniformity of the Earth's diurnal rotation. Every effort should, therefore, be made to have it carefully observed by all who possess the necessary equipment.

INSTRUMENTAL EQUIPMENT.

The requisite instruments are—

(1) A suitably mounted telescope having a clear aperture of 3 inches or more and a magnifying power of not less than 90 diameters. Observations made with telescopes having smaller apertures or lower powers will be less valuable.

(2) A timepiece, which may be either a high-class clock having a seconds pendulum, a box or pocket chronometer, or even a good lever watch.

(3) If the observer determines his own time, he will need either a transit instrument or a sextant and artificial horizon; but as most of the railroads in the United States are now run by time obtained from the great astronomical observatories, the Western Union Telegraph Company has kindly consented to grant intending observers the privilege of comparing their timepieces with the noon signals which pass through almost all telegraph offices.

NECESSARY PREPARATIONS.

Shade-glasses.—The telescope should be provided with proper shade-glasses for observing the Sun, but in their absence an ex ellent substitute can be made by smoking a slip of thin flat glass, about 1 inch wide and 4 inches long, in such a way that its tint may increase uniformly from very light at one end to a depth at the other end sufficient for viewing the brightest Sun without inconvenience. The

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smoked surface should be protected by a covering glass of the same size as the original slip and separated from it by bits of thin card inserted at the ends, the whole being bound together by a narrow strip of paper pasted around the edges.

Error of timepiece.—Most observers will probably have no other timepiece than a good pocket watch and no means of determining its error except the telegraphic noon signals. To utilize these signals, the watch should be carried to the telegraph office on November 8, 9, and 10, and on each of these days the hour, minute, and second indicated by it when the signal is received should be noted. Before November 8 care must be taken to see that when the seconds hand points to 60 the minute hand is exactly over a minute mark; and in noting the signals, if the seconds are near 60, special care will be required to avoid recording a wrong minute. For example, when the time is $4^m\ 58^s$ the minute hand will be almost exactly over 5^m, and special care must be taken not to record $5^m\ 58^s$ instead of $4^m\ 58^s$. Previous practice in calling and noting time will greatly diminish the risk of such mistakes. No matter how the watch may run, it must not be meddled with in any way, either by moving its hands or touching its regulator, between November 8 and 10. Without this precaution neither its rate nor the degree of dependence to be placed upon it can be determined.

CIRCUMSTANCES OF THE TRANSIT IN THE UNITED STATES.

All the four contacts of Mercury with the Sun's disk will be visible throughout the United States except in Maine and the northeastern parts of New Hampshire and Vermont, where the Sun will set before the third and fourth contacts, and in Alaska, where the first and second contacts will occur before sunrise. In the northeastern States the Sun will be low at the end of the transit, and in Alaska it will be low at the beginning, but in all other parts of the country the conditions will be favorable for observing the whole transit.

The following formulæ have been derived, through the Connaissance des Temps, from LE VERRIER'S tables of the Sun and Mercury, and from them the Greenwich mean times of the principal phases can readily be computed for any place where the transit will be visible:

	h m s	° ′
First contact	3 55 42.1 + [0.7952] sin φ' − [1.6351] cos φ' cos	(329 59 − λ)
Second contact	3 57 26.2 + [0.7873] sin φ' − [1.6356] cos φ' cos	(330 26 − λ)
Least distance of centers	6 34 22.7 + [1.2174] sin φ' − [1.5855] cos φ' cos	(4 44 − λ)
Third contact	9 11 24.1 + [1.4292] sin φ' + [1.5342] cos φ' cos	(217 45 − λ)
Fourth contact	9 13 8.3 + [1.4274] sin φ' + [1.5347] cos φ' cos	(218 16 − λ)

Here the quantities in brackets are the logarithms of seconds of time; λ is the longitude of the place, counted west from Greenwich, and φ' is its reduced latitude, which must be computed from its geographical latitude, φ, by means of the formula $\tan \varphi' = 0.99667 \tan \varphi$.

The American Ephemeris uses HANSEN'S Tables of the Sun and WINLOCK'S Tables of Mercury, and according to it the first contact will occur about 11 seconds earlier, and the last contact about 58 seconds earlier than indicated by the above formulæ. From its data the instants of the beginning and ending of the transit

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expressed in standard time for some of the principal cities of the United States are as follows:

Place.	Beginning.				Ending.			
	h	m	s		h	m	s	
Boston, Mass.	10	55	42	a. m.	4	12	7	p. m.
New York, N. Y.	10	55	43	"	4	12	7	"
Washington, D. C.	10	55	45	"	4	12	6	"
Charleston, S. C.	10	55	47	"	4	12	3	"
New Orleans, La.	9	55	53	"	3	12	5	"
Austin, Tex.	9	55	54	"	3	12	7	"
Columbus, Ohio.	9	55	48	"	3	12	8	"
Chicago, Ill.	9	55	50	"	3	12	12	"
Omaha, Nebr.	9	55	54	"	3	12	13	"
Denver, Colo.	8	55	59	"	2	12	17	"
San Francisco, Cal.	7	56	5	"	1	12	24	"
Portland, Oreg.	7	56	2	"	1	12	27	"

If we imagine a line drawn from the center of the Sun to the north pole of the heavens, and designate the point where that line cuts the Sun's limb as the Sun's north point, then any point on the Sun's limb may be defined by its angle east or west of the north point. In the transit under consideration the first contact of Mercury with the Sun's limb will occur at a point 98½° east of the north point; or more simply, if the observer imagines the disk of the Sun to be figured like the face of a watch, the XII being at the north point, then first contact will occur halfway between the Figures VIII and IX. That, however, is for the direct image. If an inverting telescope is used, the observer must imagine the Figure VI to be at the apparent north point, and then the contact will occur between the Figures VIII and IX, as before.

METHOD OF OBSERVING.

Atmospheric disturbances, diffraction, and other causes produce more or less indistinctness in the images of Mercury and the Sun, and render it difficult to determine the exact instants of the contacts. Among these phenomena that known as the black drop is famous. It occurs near the times of second and third contacts, when the planet is almost wholly within the Sun's disk, and is caused by the cusps of sunlight becoming blunted, and thus giving Mercury a pear-shaped appearance, as if a black drop were clinging to its side. A first-rate telescope carefully adjusted to focus and provided with sufficiently dense shade-glasses will do much to minimize these appearances, but nothing can entirely overcome the effects of a bad condition of the atmosphere.

The thing to be observed is the exact instant when the limbs of Mercury and the Sun come into contact. For the first contact all that can be done is to note the instant when Mercury first makes a perceptible indentation in the Sun's limb, and as the indentation must acquire a certain magnitude before it can attract attention the instant recorded is almost necessarily a little late. For the second and third

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contacts two methods of observing have been extensively practiced. The first consists in guessing at the instant of contact by watching the distorted forms of the cusps and endeavoring to estimate when they would have come together if they had constantly maintained their true geometrical figure. The second consists in noting the earliest instant at which sunlight certainly flashes across the interval between the two cusps as they close around the planet at second contact, or the latest instant as they open at third contact. That is a comparatively definite phenomenon, and the experience had with the transit of May, 1878, shows that it can be observed with far greater accuracy than the so-called geometrical contact. Nevertheless the motion of the planet is so slow that an uncertainty of 3 or 4 seconds attaches to the best observations, and through unfavorable circumstances it may rise to 30 seconds or more.

The best form of record will be attained by noting for the second and third contacts, respectively, the latest, or earliest, moment at which there is a distinct dark space separating the cusps, and also the earliest, or latest, moment when sunlight can be seen all around the planet. Under the most favorable circumstances these two moments may be almost identical, but if the seeing is bad there may be a period of some seconds during which the sunlight plays back and forth between the cusps in such a way as to render it impossible to decide whether or not contact has occurred.

Mercury is too small to be clearly seen upon the Sun by the naked eye. An opera glass will render it visible, but to see the transit satisfactorily a telescope of at least 3 inches aperture is necessary.

The Naval Observatory will be glad to receive observations of the transit from as many stations as possible. Each record should contain the following particulars:

1. The name of the station, including town, county, and state.
2. The date.
3. A description of the location of the station, together with its latitude and longitude.
4. A description of the timepiece and a statement of the aperture, focal length, and magnifying power of the telescope employed.
5. The comparisons of the watch with the noontime signals.
6. The time of each of the contacts, just as read from the face of the watch without the application of any correction.
7. An estimate of the uncertainty to which these times are liable.

The signatures, both of the observer at the telescope and of the time recorder.

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OBSERVATIONS MADE AT THE UNITED STATES COAST AND GEODETIC SURVEY OFFICE, WASHINGTON, D. C.

Station.—In lot just south of the United States Coast and Geodetic Survey Office on Capitol Hill, Washington, D. C. Position by triangulation, latitude +38° 53′ 13″; longitude 77° 0′ 31″ west of Greenwich (5^h 8^m 2^s).

Instruments.—The following table gives a description of the instruments used by the six observers:

Observer.	Instrument.	Aperture.	Focal Length.	Magnifying Power.
		cm.	dm.	
C. A. SCHOTT	Equatorial, by DOLLAND	10.2	18.3	40
O. H. TITTMANN	Zenith Telescope No. 5	9.0	12.4	90
E. D. PRESTON	Reconnoitering Telescope No. 30	9.0	9.8	90
E. SMITH	Zenith Telescope No. 4	7.9	11.8	99
G. R. PUTNAM	Reconnoitering Telescope No. 4	5.7	9.4	40
E. G. FISCHER	Reconnoitering Telescope No. 59	6.2	7.5	38

Timepiece and correction.—Mean time chronometer, MOLYNEUX No. 1718, was used by all the observers, the seconds being counted aloud by persons not observing. The corrections to this chronometer were as follows:

Date.	75th Mer. Time.		Fast.	Notes.
	h	m	s	
Nov. 10	10	31	0.32	Before first contact.
10	11	7	0.28	After second contact.

These corrections are derived from comparisons with sidereal chronometers, NEGUS No. 1823, and NEGUS No. 1824, the corrections to which were determined by star transit observations in the small observatory near the office, by G. R. PUTNAM.

MOLYNEUX No. 1718, was also compared with the noon signals from the Naval Observatory, received telegraphically, as follows:

Date.	Fast.
	s
Nov. 8	0.2
9	0.3
10	0.6

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which agrees well with the above. The error being so small, no correction is applied to the transit of Mercury observations.

Observed Times of Contacts (Chronometer Time).

[Civil Time.]

Observer.	First Contact.			Second Contact.			Third Contact.			Fourth Contact.		
	h	m	s	h	m	s						
C. A. SCHOTT	10	57	9	10	58	25	Lost by clouds.			Lost by clouds.		
O. H. TITTMANN	10	57	0	10	58	26	"	"	"	"	"	"
E. D. PRESTON	..	..	..	10	58	18	"	"	"	"	"	"
E. SMITH	10	57	0	10	58	23	"	"	"	"	"	"
G. R. PUTNAM	10	57	0	10	58	25	"	"	"	"	"	"
E. G. FISCHER	10	56	43	10	58	18	"	"	"	"	"	"

REMARKS.

C. A. SCHOTT: "Little value is attached to observation of the external contact, supposed to be about 15^s too late, Sun's limb very unsteady and wind shaking telescope. The time of the interior contact is that of the first streak of light flashing around the eastern limb of the planet; it closed up again and reopened perhaps in half a second. Third and fourth contacts lost by clouds; 2½ minutes before third contact a heavy cloud rolled up before the Sun, hiding it for about 6 minutes."

O. H. TITTMANN: "First contact, the planet was quite perceptibly on the Sun's limb; second contact, time of rupture of black drop."

E. D. PRESTON: "Second contact, last dark band, $10^h\ 58^m\ 11^s$; first light, $10^h\ 58^m\ 26^s$; mean, $10^h\ 58^m\ 18^s$."

E. SMITH: "Edge of Sun fair. First contact, lobe of planet well on; second contact, uncertain; it may be anywhere between 10^s and 35^s."

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OBSERVATIONS MADE AT THE OBSERVATORY OF THE CATHOLIC UNIVERSITY OF AMERICA, WASHINGTON, D. C.

Date.	Contact.	Eastern Standard Time.			
		h	m	s	
Nov. 9	First.....	22	57	2	Uncorrected times 30^s less than these, correction of $+30^s$ to watch determined by very accordant sextant observations.
9	Second...	22	58	12	
10	Third....	4	11	20	
10	Half out.	4	12	10	
10	Fourth...	4	12	55	

The position of the Observatory is latitude $+38°$ 56′ 15″ and longitude 77° 0′ 0″ west of Greenwich.

The observations were made with a telescope of 9-inch aperture, 9 feet 10 inches focal length, and power 118. Watch chronometer, by HOWARD; rate, one-half second a day, losing.

For the first and second contacts the aperture was cut down to 1¾ inches; the images not being very good with this, the third and fourth contacts were observed with an aperture of 3¼ inches, with which the image was excellent. No distortion or "black drop" was noticed. Observations were made by signals from observer to recorder at watch.

The first contact is probably somewhat late, for obvious reasons. The others were considered very satisfactory.

Observer, G. M. SEARLE; recorder, A. DOOLITTLE.

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OBSERVATIONS MADE AT THE HARVARD COLLEGE OBSERVATORY, CAMBRIDGE, MASS.

Report of Prof. E. C. PICKERING, Director.

I. Instrument, 5-inch auxiliary telescope.
Aperture, 4 inches; focal length, 74 inches; power, 74 diameters.
Chronometer, RICHARD No. 112 (pocket).

Chronometer Comparisons.

	M. T. C. BOND No. 394. (Corr. East Std.)	Chronometer.
	h m s	h m s
Before egress	3 47 0	3 48 29.5
After egress	4 22 0	4 23 31.0

Observed Times of Contacts.

(Uncorrected Chronometer.)

Contact.	Time.
	h m s
Third	4 12 23.5
Fourth	View cut off.

Estimated uncertainty of observed time of third contact, $5^s.0$.
WILLIAM H. ATTWILL, observer; ROBERT S. DAVIDSON, recorder.

II. Instrument, ALEXIS CASWELL.
Aperture, 4 inches; focal length, 55 inches; power, 140 diameters.
Chronometer, watch.

Chronometer Comparisons.

	M. T. C. Bond No. 394. (Corr. East Std.)	Chronometer
	h m s	h m s
Before ingress	22 15 0	22 15 11.0
After egress	4 37 0	4 37 12.5

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Observed Times of Contacts.

(Uncorrected Chronometer.)

Contact.	Time.
	h m s
Third	4 11 32.5
Fourth	Seeing too poor to observe.

Estimated uncertainty of observed time of third contact, 10ˢ.

J. RAYNER EDMANDS, observer; LOUISA WINLOCK, recorder.

III. Instrument, east equatorial finder.

Aperture, 4 inches; focal length, 59 inches; power, 118 diameters.

Chronometer, FRODSHAM No. 3451.

Chronometer Comparisons.

	M. T. C. Bond No. 394. (Corr. East Std.)	Chronometer.
	h m s	h m s
Before egress	3 55 0	3 55 37.2
After egress	4 25 0	4 25 42.2

Observed Times of Contacts.

(Uncorrected Chronometer.)

Contact.	Time.
	h m s
Third	4 11 39.2
Fourth	4 12 52.0

Estimated uncertainty of observed times of contacts: Third contact, 4ˢ.7; fourth contact, 10ˢ.0.

EDWARD S. KING, observer; EDWARD B. WAITE, recorder.

IV. Instrument, 6-inch west equatorial.

Aperture, 4 inches; focal length, 97.6 inches; power, 195 diameters.

Chronometer, BLISS and CREIGHTON No. 1182.

Chronometer Comparisons.

	M. T. C. Bond No. 394. (Corr. East Std.)	Chronometer
	h m s	h m s
Before egress	3 50 0	3 50 11.3
After egress	4 19 0	4 19 11.3

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Observed Times of Contacts.

(Uncorrected Chronometer.)

Contact.	Time.
	h m s
Third	4 11 10
Fourth	Seeing too poor to observe.

Estimated uncertainty of observed time of third contact, 10ˢ.

EDWARD C. PICKERING, observer; WILLIAM B. CLYMER, recorder.

V. Instrument, 15-inch east equatorial.

Aperture, 6 inches; focal length, 270 inches; power, 135 diameters.

Chronometer, FRODSHAM No. 3451.

Chronometer Comparisons.

	M. T. C. Bond No. 394. (Corr. East Std.)	Chronometer.
	h m s	h m s
Before egress	3 55 0.0	3 55 37.2
After egress	4 26 0.0	4 26 42.2

Observed Times of Contacts.

(Uncorrected Chronometer.)

Contact.	Time.
	h m s
Third	4 11 42.5
Fourth	4 12 52.0

Estimated uncertainty of observed times of contacts: Third contact, 3ˢ; fourth contact, 5ˢ.

O. C. WENDELL, observer; EDWARD B. WAITE, recorder.

No observations could be obtained at ingress, owing to clouds.

At egress, the sky around the Sun was clear, but the Sun was very near the horizon and its limb was extremely ill defined, the extent of the undulations exceeding the diameter of the disk of Mercury. Five observers obtained determinations of the time of third contact, and two of them also observed the fourth. The apertures of all the telescopes used were reduced to 4 inches, except in the case of the east equatorial, the aperture of which was reduced to 6 inches.

Each observer was assisted by a recorder, who noted the time of the signals given him by the observer. The timepieces employed in these observations were compared shortly before and after the observed phenomena with the standard mean time clock of the Observatory, BOND No. 394, which was regulated accurately to "Eastern Time," 5 hours slow of Greenwich Mean Time.

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In the following tabular arrangement of the observations the successive columns name the observer, the instrument employed, its focal length, its magnifying power, the Greenwich Mean Time of the observed contacts, and the uncertainty of each observation according to the judgment of the observer:

Observer.	Instrument.	Focal Length	Power.	Times of Contacts.							
				Third.				Fourth.			
		in.		h	m	s	s	h	m	s	s
W. H. ATTWILL	Portable 5-inch refractor	74	74	9	10	52.8 ± 5		..	..	....	..
J. R. EDMANDS	Refractor by A CASWELL	55	140	9	11	20.1 ± 10		..	..	....	..
E. S. KING	Finder of east equatorial	59	118	9	10	58.8 ± 5		9	12	12.1 ± 10	
E. C. PICKERING	West equatorial	98	195	9	10	58.7 ± 10		..	..	....	..
O. C. WENDELL	East equatorial	270	135	9	11	2.8 ± 3		9	12	12.1 ± 5	

REMARKS.

The station of W. H. ATTWILL was at the photographic laboratory of the Observatory; latitude +42° 22′ 49″.0, longitude 4^h 44^m $31^s.18$ west of Greenwich. The view of the fourth contact was impeded by the roof of a church to the southwest.

The station of J. R. EDMANDS was at his house, near the Observatory, latitude +42° 22′ 48″.6, longitude 4^h 44^m $30^s.41$ west of Greenwich. Ten seconds before the time given above, as that of the third contact, the observer remarked, "Planet now in the waves;" that is, in the irregular undulations of the image of the Sun's limb. Twenty-one seconds later he remarked, "Third contact past." The time given as that of contact is estimated. No actual tangency of the limbs of Mercury and the Sun was observed.

The station of E. S. KING was in the principal dome of the Observatory; latitude +42° 22′ 47″.6, longitude 4^h 44^m $30^s.99$ west of Greenwich. The time given as that of third contact is the mean of two, $9^s.3$ apart. The remark at the first of these times was, "First possible time of third contact;" at the second, "Contact surely past." The time given for that of fourth contact is 5 seconds later than one at which the remark was made, "Contact supposed to have taken place." This allowance of 5 seconds was made subsequently by the observer without knowledge of the record of O. C. WENDELL, with which the corrected time exactly agrees.

The station of E. C. PICKERING was in the west dome; latitude +42° 22′ 47″.6, longitude 4^h 44^m $31^s.05$ west of Greenwich. The estimated time of third contact is $3^s.8$ previous to that of a remark, "Third contact apparently past." At a time $13^s.8$ later, it was estimated that the disk of Mercury was bisected by the Sun's limb.

The station of O. C. WENDELL was in the principal dome; latitude +42° 22′ 47″.6, longitude 4^h 44^m $30^s.99$ west of Greenwich. At a time $4^s.5$ previous to that noted as the time of third contact light was seen between the limbs of Mercury and the Sun. Fourteen seconds before the time of the fourth contact the planet was still visible, and 14 seconds after the fourth contact that phenomenon was certainly past.

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OBSERVATIONS MADE AT THE VASSAR COLLEGE OBSERVATORY, POUGHKEEPSIE, N. Y.

Report of Miss M. W. WHITNEY, Director.

The transit of Mercury was obscured by clouds here, both at beginning and ending, except at second contact. I send two observations made by our students. The uncertainty in the values may be 5^s or more, since up to the instant of contact the Sun was still obscured and the observers were hardly prepared for the sudden clearing.

The position of the Observatory is longitude $4^h\ 55^m\ 33^s.6$ west of Greenwich, latitude $+41°\ 41'\ 18''$.

Timepiece used by both recorders was a BOND chronometer, error obtained by comparisons with sidereal clock.

Observer.	Recorder.	Object-glass.	Power.	Chronometer Corr.	Eastern Standard Time, Second Contact.
				m s	h m s
LAURA BROWNELL	ANNE MOORE	5-inch	115	+1 17.55	22 57 14.0
MAUD ORWIG	EDITH A. LAPHAM	3-inch	68	+1 17.55	22 57 9

OBSERVATIONS MADE AT THE SAYRE OBSERVATORY, LEHIGH UNIVERSITY, SOUTH BETHLEHEM, PA.

Report of Prof. C. L. DOOLITTLE, Director.

Aperture of telescope, 6 inches; magnifying power, 130.

First contact, $14^h\ 14^m\ 35^s$. This is late by probably 10^s. The limb of the Sun was quite ragged, and the contact was not observed until there was a very appreciable indentation.

Observed time of second contact, $14^h\ 15^m\ 58^s.9$.

At $14^h\ 16^m\ 3^s$ contact certainly past. There was something very much like the black drop at this contact, which seemed to disappear at the last recorded time. The limb of the Sun was so unsteady, however, that it was hardly possible to be certain as to what was actually seen.

The times given are local sidereal time, corrected for error of clock.

Position of Observatory, latitude $+40°\ 36'\ 23''.9$, longitude $0^h\ 6^m\ 40^s.19$, east of Washington. Clouds prevented observation of third and fourth contacts.

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OBSERVATIONS MADE BY A. W. QUIMBY,

2726 ANN STREET, PHILADELPHIA, PA.

The place of observation is in the city of Philadelphia, approximately 1½ miles north of the Philadelphia Observatory and 2½ miles east of it. I regret to say that I have not the necessary instruments for the accurate determination of latitude and longitude. I use the yard of my home for my daily observations of sun-spots for the Zürich work on periodicity. Sometimes the air is very steady; indeed the definition in the early morning is remarkably fair for a city.

The telescope is a French objective furnished by Queen & Co., 4½ inches clear aperture, and 64½ inches focal length. The eyepiece which I usually employ on the spots, and which I used on the transit, is a triple negative giving about 90 diameters. I used with it a helioscope, consisting of one prism and three black reflectors.

EDWARD W. SHARP (pharmacist), very kindly consented to note the time. His watch usually varies but 5 seconds per month, but has been repaired lately and is not yet regulated to its standard. On November 8 it was 22 seconds fast and on November 10 it was 1 minute 8 seconds fast.

Everything was in readiness and the definition of the Sun's limb was quite fair, when just a few minutes before contact clouds obscured the Sun and prevented all examination until a few minutes after the second contact.

We succeeded in observing the last contacts, which Mr. SHARP noted as follows, and which are the uncorrected readings of the watch:

Contact.	Uncorrected Watch Time.		
	h	m	s
Third	4	12	13
Fourth	4	13	46

The Sun being at a low altitude the definition was bad, the limb boiling, and I would estimate the uncertainty of the third contact as 10 seconds and that of the fourth as 22 seconds.

During the cloudless intervals I made some negatives which are of value only as curios. There were some suspicious features about the planet's appearance which made me think of an atmosphere, the more so as I was not looking for it when it suggested itself.

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OBSERVATIONS MADE AT THE SWARTHMORE COLLEGE OBSERVATORY, DELAWARE COUNTY, PA.

Report of S. J. CUNNINGHAM.

The third and fourth contacts of the transit of Mercury were obtained at this Observatory.

The Observatory is situated in an open space with good views; the latitude and longitude are not accurately determined.

The equatorial telescope used has a 6-inch object-glass of about 7 feet focal length, and a magnifying power of 125.

My watch was used for time in connection with the Allegheny Observatory, and on November 9 at 2 p. m. was 11 seconds slow, on November 13 at 2 p. m. 1½ seconds fast.

The third contact was at $4^h\ 11^m\ 19^s$; the fourth at $4^h\ 12^m\ 38^s$. The limb was boiling and the fourth contact was probably a little late. The third contact was better. H. V. GUMMERE observed contacts and I noted the time. The first contact and second were obscured by clouds, though the planet was seen immediately after entrance.

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OBSERVATIONS MADE AT THE ASTRONOMICAL OBSERVATORY OF PENNSYLVANIA COLLEGE, GETTYSBURG, ADAMS COUNTY, PA.

The Observatory is located in the northwestern part of the town, latitude +39° 49′ 58″, longitude 77° 13′ 30″ west of Greenwich.

An equatorial telescope was used; aperture, 6½ inches; focal length, 98 inches; magnifying power, 261.

Three timepieces were employed: (a) A good chronometer, break-circuit sidereal, by NEGUS, rate is 1ˢ.35 slow per day; (b) a watch; (c) a watch.

(a) Transit of α Lyræ, November 12, by chronometer, $18^h\ 33^m\ 20^s.29$.

(b) Time of noon signals:

		h	m	s
H. F. RICHARDS'S watch..	November 8.....	12	0	5
	November 9.....	11	59	16
	November 10.....	11	58	33

(c) Time of noon signals:

		h	m	s
O. O. LEIDICH'S watch...	November 8.....	11	59	40
	November 9.....	11	59	36
	November 10.....	11	59	29

Only the first two contacts were taken, the last two being obscured by clouds:

Contact.	Chronometer Time.	Watch Time. [Civil Time.]	
		H. F. Richards.	O. O. Leidich.
	h m s	h m s	h m s
First.....	14 7 39	10 57 4	10 56 55
Second.....	14 8 42	10 57 57	10 57 50

The time given for the second contact is the time at which Mercury had fully entered the Sun's disk. Two readings had been made before this.

The time of the first contact was late from 10 to 15 seconds.

HENRY B. NIXON, observer; NATHANIEL C. BARBYHENN, recorder; LUTHER F. MILLER, recorder; HERBERT F. RICHARDS, recorder; OTIS O. LEIDICH, recorder.

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OBSERVATIONS MADE BY JUSTICE STAHN,

SECRETARY OF THE BALTIMORE ASTRONOMICAL SOCIETY, 506 ENSOR STREET, BALTIMORE, MD.

Telescope, 4½-inch aperture; power, 50; 75th meridian time; chronometer, W. No. 2616; chronograph, WALTHAM; air rather unsteady.

Contact.	Observed Time.		
	h	m	s
First.....	10	57	10
Second.....	10	58	50

The cross wires of the eyepiece were set to mark the position of estimated contact therefore I watched exactly at point of ingress. Buildings interfered with last contact. The true time of estimated contact is about 3 seconds earlier than the above, making it as follows:

[Civil Time.]

Contact.	Corrected Time.		
	h	m	s
First.....	10	57	7
Second.....	10	58	47

The weather having been cloudy in the morning, I thought the transit would not be visible, and having been lately using a spectroscope for observations of prominences I did not use my position micrometer.

When I found that the weather would be good I finished up in the observatory and had about 8 minutes to spare to place eyepiece with cross wires on the telescope and let the Sun travel along the horizontal wire. Estimating the position accordingly, the first contact occurred 98° from the north point of the Sun, or thereabouts. Interpolating for differences according to the Nautical Almanac to find time of conjunction, by heliocentric coordinates I made the times of contacts earlier than predicted times for Greenwich.

With the high power on the telescope I could not get a clear disk of Mercury, for which I was very sorry, as I wished to measure the diameter. I also noticed that following Mercury there seemed to be a dark haze, but, as I before remarked, the air was unsteady and therefore I did not attempt to make any more observations until 3 p. m. I used the method of projection on a screen, but the image of Mercury was disappointingly small—about as large as one of the sun-spots.

The shadow which accompanied the planet was not very dark, but more like the shading of a penumbra of a sun-spot, and nothing like as dark as Mercury; but it followed Mercury right along. When definition was good I could not notice anything much of it, if at all; therefore I think the shadow was caused by bad definition. If it was a satellite of Mercury it should have been smaller, or if of the same size, as dark as Mercury. The shading was large and irregular.

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OBSERVATIONS MADE AT THE PHYSICAL LABORATORY OF THE UNIVERSITY OF VIRGINIA.

The position of the Laboratory is latitude $+38°\ 2'\ 11''.4$, longitude $5^h\ 14^m\ 0^s.68$ west of Greenwich.

The instruments used were a 6-inch glass speculum, silvering removed, Newtonian form, magnifying power estimated as 150; a fine American watch.

Observer at the telescope, F. H. SMITH; with the watch, J. H. CORBITT.

Comparison of the watch with the noon signal of the Western Union Telegraph by J. H. CORBITT: November 8, 14 seconds fast; November 9, 19 seconds fast; November 10, 23 seconds fast.

[Civil Time.]

Contacts.	Observed Watch Times.				Corrected Watch Times.			
	h	m	s		h	m	s	
Ingress: Exterior	10	57	37	a. m.	10	57	14	a. m.
Interior	10	59	4	a. m.	10	58	41	a. m.
Egress: Interior	4	11	58	p. m.	4	11	34	p. m.
Exterior	4	13	19	p. m.	4	12	55	p. m.

At the first exterior contact the boiling on the edge of the Sun's image was great and the time of contact consequently rendered somewhat uncertain.

At the first interior contact the image of the planet had some fuzziness in its outlines.

The interior contacts were noted by the first appearance and disappearance of the line of light between the planet and the outline of the solar disk.

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OBSERVATIONS MADE AT WILMINGTON, N. C.

By E. S. MARTIN.

The day was cloudless, the air clear, and the limb of the Sun remarkably sharp and steady at ingress, though somewhat wavy and agitated at egress. The instrument used was a refractor, with a 5-inch aperture and power 105, made lately by ALVAN CLARK and Sons.

The times of contacts were taken from an excellent chronometer watch corrected by the noon signals sent from the Naval Observatory, and I thought it nearly correct, if not truly so. I had calculated the times of first and fourth contacts for this place, latitude +34°.14, longitude 77° 56′ 35″ west of Greenwich, which are given in the following table together with the observed times:

[Civil Time.]

Contact.	Eastern Standard Time.						
	Computed.			Observed.			
	h	m	s	h	m	s	
First	10	55	45.88	10	57	15	a. m.
Second	..	..	.....	10	59	8	a. m.
Third	..	..	.....	4	11	2	p. m.
Fourth	4	12	3.61	4	12	55	p. m.

You will perceive that the difference between the calculated and observed times of first contact is $1^m\ 29^s.12$, observed time being that much slow.

(Extract from a letter three days later.)

I take pleasure in sending as requested the times of contacts as read from my watch before correction and also the times by watch when thc noon signals were received.

Times by watch before correction:

Contact.	Uncorrected Watch Time.		
	h	m	s
First	10	56	15
Second	10	58	8

The time by watch of the noon signal was $11^h\ 59^m\ 0^s.5$, and I allowed $0^s.5$ more for estimated errors in taking, making the watch slow of the noon signal 1^m.

The third and fourth contacts reported were exactly as taken by the watch, I having set it up 1^m at noon. I was unable to compare the watch with signals on November 9 and 11 to ascertain the rate and error more accurately.

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OBSERVATIONS MADE AT SAVANNAH, GA.

Report of OTIS ASHMORE, Instructor Natural Science, High School,

and

WALTER S. WILSON, Principal, Chatham Grammar School.

I herewith transmit the results of two independent observations made at Savannah. These observations were planned by myself, and in them I was kindly assisted by W. S. WILSON, A. J. O'HARA, JULIAN HARTRIDGE, and Dr. F. C. WILSON. I had at my disposal two telescopes, one, which I will designate as (A), had an objective with a clear aperture of 3¼ inches and a focal length of about 50 inches. An ocular, giving a power of about 80 diameters, was used. This glass was a good one, giving a very clear definition. I myself took charge of the telescope.

The other telescope had a clear objective aperture of 2¾ inches, and an ocular was used giving a power of about 60 diameters. The field was clear. This telescope, which I designate as (B), was in charge of Mr. WILSON. Both glasses were mounted on a long piazza on the third floor of the Chatham Academy, near the center of the city, and commanded an unobstructed view of the southern heavens. Each tube was removed from its tripod mounting and placed upon firm supports against the pillars of the piazza in such a manner as to secure perfect steadiness and easy motion along the plane of the equator. The altitude of the Sun had been computed several days in advance and all the arrangements for securing the telescopes in firm positions were carefully planned, and they proved to be all that could be desired. Perfect steadiness was secured.

Mr. HARTRIDGE and Doctor WILSON recorded the observations for Mr. W. S. WILSON; and Mr. O'HARA for me.

An explanation and drill were given before the contacts to secure accuracy. Great care was taken to avoid error of every kind, and I have reason to think that the only error in this report lies in the inability of the observers to note exactly the times of contacts with our small glasses, and this I am sure is limited to a few seconds only.

I had two watches carefully rated at a jeweler's in the city for several days before the transit, using the signals sent out from Washington at 11 o'clock 75th meridian time daily. The one used by Mr. HARTRIDGE with telescope (B) had a very uniform rate, losing only 2 seconds a day. The watch used by Mr. O'HARA was losing 1½ seconds a day, but its rate varied from 1 to 4 seconds. About 40

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minutes after the first contacts I took both watches to the Western Union Telegraph Office and compared their times with the regulator pendulum clock there. I had asked the chief operator that morning to note carefully the signals sent over the wire, and he told me that he had done so and had set the clock exactly on the transmitted time. The clock, he said, was about 1 second fast before the correction was made.

The watch used with telescope (B) was found to be 8 seconds slow, and the one used with telescope (A) was 2 seconds fast. Their small rates and the short time between the observations and comparisons warranted me in taking the errors at time of comparison as the errors at time of observation. The latitude and longitude of the station are nearly the same as that of the City Exchange, about 400 yards to the north. For the Exchange the latitude is $+32^\circ\ 4'\ 51''.78$, longitude $81^\circ\ 5'\ 20''.49$, west of Greenwich.

Astronomical oculars were used on both telescopes, and a few minutes before the computed time of first contact the glasses were turned and focused sharply upon the limb of the Sun, which had previously been designated by drawings for that purpose. The time recorders, with watches on the tables before them, took their positions and called and checked off the even minutes, while they stood ready to note accurately and record at once the time called by the observer at the telescope. The day was clear and but little flickering of the limb was noticeable.

At $10^h\ 57^m\ 4^s$ I saw the dark edge of the planet, exactly at the point expected, encroaching rapidly upon the bright disk of the Sun. It is probable that the actual contact occurred several seconds before I could see the notch. I think a fair limit of error would be one-fourth of the diameter of the planet. Mr. WILSON announced contact several seconds later, and felt sure that the planet was well on before he called time. His eye, being unaccustomed to Sun observations, had grown somewhat weary. The second contact, which was estimated in the presence of the black drop, at the time of internal tangency, is entitled to far more weight with both observers, and the breaking of the black drop was sufficiently sharp as to reduce the limit of error to not more than 5 seconds, and in all probability the error was not over 1 or 2 seconds.

As the planet proceeded across the Sun's disk it was observed from time to time with higher powers. There did not appear in our small glasses any fringe or blurring of the edges of the planet, but the disk appeared to be black and clean-cut, with sharp limbs.

All the necessary preparations were made to observe the last two contacts, and the observers were in place a few minutes before the time, but a cloud drifted between us and the Sun about 4 minutes before contact, completely obscuring it from view. At 4.15 the clouds parted and through the rift we caught a clear image of the Sun in our telescopes, but the transit was over.

Another comparison of watches with the clock showed no perceptible change in either.

The black drop was quite noticeable to both of us, but broke quickly. While the first contact is subject to considerable error, as much as 40 seconds perhaps, I feel sure that the second contact and the breaking of the black drop were noted with much more certainty. A limit of error of 5 seconds probably is sufficient.

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[Civil Time.]

	75th Meridian Time.		
	First Contact.	Second Contact.	Breaking of Black Drop.
	h m s	h m s	h m s
Observed time	10 57 4	10 58 0	10 58 30
Watch corr	−2	−2	−2
Corrected time	10 57 2	10 57 58	10 58 28
Computed time	10 55 48	10 57 32	
Difference	1 14	26	

OTIS ASHMORE, observer; A. J. O'HARA, recorder.

	First Contact.	Second Contact.	Breaking of Black Drop.
	h m s	h m s	h m s
Observed time	10 57 14	10 57 54	10 58 21
Watch corr	+8	+8	+8
Corrected time	10 57 22	10 58 2	10 58 29
Computed time	10 55 48	10 57 32	
Difference	1 34	30	

W. S. WILSON, observer; J. HARTRIDGE and Doctor WILSON, recorders.

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OBSERVATIONS MADE AT THE DETROIT OBSERVATORY, ANN ARBOR, MICH.

Report of Prof. A. HALL, jr.

I.

	Chronometer Time.			
	h	m	s	
Egress.....	18	58	12.	Ring of light visible all around Mercury.
	18	58	52.5	Ring of light visible all around Mercury.
	18	59	11.	Ring of light visible all around Mercury.
	18	59	27.	Third contact.
	19	0	3.5	Mercury still on Sun.
	19	0	27.5	Mercury still on Sun.
	19	0	41.5	Fourth contact.

A. HALL, jr., professor of astronomy, observer; G. K. LAWTON, recorder.

A 6.05-inch equatorial was used with a focal length of 8 feet 1 inch and power 120.

Sidereal chronometer, NEGUS No. 578, was used. Chronometer correction, $-2^m\ 50^s.2$.

Fourth contact very poor; clouds. Air was unsteady and images very poor. Cloudy at times of first and second contacts and clouds drifting across the Sun all day. It is clearing up cold after a number of days of rain and snow. Could observe no special phenomena.

II.

	Chronometer Time.			
	h	m	s	
Egress.....	18	54	1	Third contact.
	18	55	23	Fourth contact.

S. D. TOWNLEY, instructor of astronomy, observer and recorder.

A 12¼-inch equatorial cut down to 5.5 inches was used with a focal length of 16 feet 8¼ inches and power 160.

Sidereal chronometer, NEGUS No. 721, was used. Chronometer correction, $+2^m\ 26^s.1$.

Clouds at time of ingress. Sun came out at $13^h\ 44^m\ 44^s$. Mercury on the Sun's disk about 1½ diameters of planet from Sun's limb.

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Times of egress somewhat uncertain; clouds. Mercury was surely touching limb at $18^h\ 55^m\ 16^s$, surely passed at 23^s. Seeing rather poor.

III.

	Chronometer Time.	
	h m s	
Egress.....	18 54 2	Third contact.
	18 55 30	Fourth contact.

C. R. GILLIS, observer and recorder.

The finder of the 12¼-inch equatorial was used with a focal length of 2 feet 9½ inches and diameter of object-glass 2⅜ inches; power 20.

Sidereal chronometer, NEGUS No. 721, was used. Chronometer correction, $+2^m\ 26^s.1$.

Fourth contact very uncertain on account of clouds. Seeing very poor.

The position of the Detroit Observatory as given in the American Ephemeris is latitude $+42°\ 16'\ 48''.0$, longitude $5^h\ 34^m\ 55^s.19$ west of Greenwich.

IV. Observations made at the Ann Arbor High School Observatory.

This observatory is 83 feet north and 260 feet west of the Detroit Observatory. J. MONTGOMERY, instructor in the High School, observed the third contact with the equatorial, using his watch as a timepiece, and comparing it before and after egress with TIEDE clock, No. 125, of the Detroit Observatory.

	Watch Time.	
	h m s	
Egress....	3 37 50	Third contact.

J. MONTGOMERY, observer and recorder.

A 4⅛-inch equatorial was used, with focal length of 4 feet 9 inches and power 80.

The watch correction was $-12^s.5$.

Clouds, and seeing very poor, so that could not observe fourth contact.

(Note by A. HALL, jr.—The minute and second hands of Mr. MONTGOMERY'S watch were not together. He has evidently made a mistake of 1^m in time of observation.)

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OBSERVATIONS MADE AT THE MORRISON OBSERVATORY, GLASGOW, MO.

Report of Prof. C. W. PRITCHETT.

Preparations were made; by reducing the aperture of the CLARK equatorial from 12¼ to 7 inches; by adjusting the micrometer to indicate accurately the point on Sun's limb of first contact; by testing the solar focus and that of the eyepiece (275); and by fitting a suitable shade over the ocular.

The equatorial, meridian circle, sidereal clock and chronometer, and chronograph are fully described in No. I, Publications of this observatory; also in Appendix V, Washington Observations, 1877, where also the geographic coordinates are given, as published annually in the American Ephemeris.

The first contact was due about $9^h\ 56^m$ central mean time; but to my great chagrin the Sun was not visible at Glasgow a single moment the whole day until a few minutes before 3 p. m. The thick clouds then suddenly broke, and five minutes before the third contact the sky was perfectly clear in that quarter. Having made timely preparation I was able to utilize the few critical minutes at the very last. The driving clock was clamped with Mercury full in view as a bluish-black disk on the n. p. quadrant of the Sun. Precaution was taken against accident at the chronograph by having an assistant note the clicks of the recording key from the face of the sidereal chronometer, NEGUS No. 1590, the same having been accurately compared with the standard sidereal clock FRODSHAM No. 1369. There was no accident at the chronograph, but the chronometer readings beautifully confirmed the record of the chronograph. We had to observe through a frosty atmosphere, for the mean temperature of the day was as low as 27° Fahrenheit and the mean per cent of humidity was 77; hence, as was to be expected, the images were unsteady and the quivering of the limbs tended to diminish the precision of the observations. The limbs, however, both of Sun and planet, were well defined. The time was noted for the following three phases:

(I.) The moment when the dark ligament or band was definitely recognized between the limb of Mercury and the Sun; the planet was then apparently entirely within the Sun's disk. One or two seconds may have been lost in making sure of this phenomenon.

(II.) The moment of internal geometric contact, when the dark band or drop vanished and cusps with sharp thin points were formed.

These cusps became more and more obtuse, as more and more of the planetary disk passed off the Sun's limb until at phase three the cusps vanished entirely.

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(III) The moment of external contact.

The readings from the chronograph sheet were from sidereal clock, FRODSHAM No. 1369:

Phase.	I	II	III
	h m s	h m s	h m s
	18 19 43.40	18 20 4.05	18 21 18.95
Clock corr. $\Delta T =$	+30.39	+30.39	+30.39
Local sidereal time.....	18 20 13.79	18 20 34.44	18 21 49.34

The culmination of α Lyræ occurred within 12 minutes of these observations and was observed on the meridian circle with the same adjustment of the chronograph and on the same sheet. From this observation the final clock correction $+ 30^{s}.39$ was obtained.

From these local sidereal times the following Greenwich mean times may be deduced with weights of scale 0 to 5:

Phase.	Greenwich Mean Time.	Weight.
	h m s	
I	9 11 29.81	4
II	9 12 9.35	3
III	9 13 5.09	3

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OBSERVATIONS MADE AT ALTA, BUENA VISTA COUNTY, IOWA.

By DAVID E. HADDEN, Pharmacist.

Location of station is approximately latitude + 42° 40′, longitude 95° 15′ west of Greenwich. Altitude above sea level 1,560 feet.

Timepiece, telescope, etc.—Excellent Hampden Watch Co. adjusted watch; telescope employed, 3-inch aperture, Jena glass objective, 42½ inches focal length, made by J. A. BRASHEAR, Allegheny, Pa.; magnifying power 85, with diagonal eyepiece.

Timepiece compared with noon telegraphic signals on November 9 and 10:

Times of Contacts, Corrected for Errors of Timepiece.

[Civil Time.]

Contacts.	Standard Central Time.	
	h m s	
First.....	.. .. ..	Could not observe, owing to atmospheric conditions; high wind; temperature 15°; air filled with flying particles of frost; Sun's limb very unsteady.
Second....	9 59 45	This time is fully 2 minutes late and of no value; I recorded the moment at which I was sure I could see a ring of light between the planet and Sun's "boiling" limb.
Third.....	3 11 30	This was accurately observed and will probably not be over 1 or 2 seconds in error.
Fourth....	3 13 3	Sun's limb a little unsteady at moment of contact, and hence the time is probably a little late.

About noon, air was steady and definition good. Mercury appeared of a uniform jet black color, without any haziness or other markings on planet. Professor CROSBY, Principal of High School, was time recorder at third and fourth contacts.

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OBSERVATIONS MADE AT THE CREIGHTON UNIVERSITY OBSERVATORY, OMAHA, NEBR.

Report of Prof. C. J. BORGMEYER, S. J.

Tried but failed to observe the contacts of Mercury 10th inst. a. m. Sky hazy until 10. At 10 Mercury became visible on Sun, its full diameter or more inside disk. Had no micrometer on eyepiece. From 10 a. m. to 3 p. m. sky very clear. Third contact, $3^h\ 12^m\ 38^s.6$. At that time I judged that the two circles would touch. Fourth contact I have marked $14^m\ 5^s.05$, but could determine nothing with certainty. Haze again coming up, and at 15^m rendered the Sun invisible. The above are the corrected times. Mean-time clock breaks circuit every 2^s. Rate of clock $+3^s.5$ in 24 hours. Correction at time, $-1^m\ 39^s.25$. Obtained by comparing clock with Washington noon signal in Western Union office by means of a chronometer, HEINRICH No. 502, New York. Had not been used for a long time, hence rate was very poor. Compared clock with chronometer in half an hour after signal.

A 5-inch equatorial, STEWART, London, was used in longitude $1^h\ 15^m\ 35^s.4$ west of Washington, latitude $+41°\ 16'\ 5''.57$. Up to 10 a. m. temperature in transit room was 31°. Outside a kind of snow of frozen mist, driven by a lively breeze from north of west.

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OBSERVATIONS MADE AT THE CHAMBERLIN OBSERVATORY OF THE UNIVERSITY OF DENVER.

Report of Prof. HERBERT A. HOWE.

I. Station, University Park, Colo.; latitude $+39°\ 40'\ 36''.3$, longitude $1^h\ 51^m\ 35^s.61$ west of Washington; elevation above sea level, 5,400± feet.

The instrument used was a 20-inch equatorial refractor, aperture reduced to 12 inches; polarizing eyepiece, with power of 220 diameters.

The timepiece was a sidereal chronometer, FRODSHAM No. 2593. Error of timepiece determined by observations with meridian circle at first and second contacts, $38^s.21$ slow; at third and fourth contacts, $38^s.84$ slow.

Contacts.	Observed Sidereal Time.			Reduced Local Mean Time. [Civil Time.]			
	h	m	s	h	m	s	
First	12	15	54	8	57	22	a. m.
Second	12	17	21	8	58	49	a. m.
Third	17	31	3	2	11	40	p. m.
Fourth	17	32	45	2	13	22	p. m.

REMARKS.

Mr. EUGENE M. ANTRAM counted loudly the seconds indicated by the chronometer face, and I noted according to his counting. I looked for the planet before the first contact, but did not see it until the notch was quite large. I then estimated that one-fifth or one-sixth of the planet's diameter had entered upon the disk. A ring of light was looked for around the invisible part of the planet's disk, between first and second contacts, but none was seen. The planet was seen through light clouds and the definition was poor. The second contact was satisfactorily observed. Before this contact the planet was distorted by the black drop, but as previous experiments with an artificial representation of second contact had convinced me that for my telescope and eye the black drop was caused almost entirely by bad definition and that its size varied with the fluctuations of the atmosphere. I waited patiently in the hope that the seeing might improve at the time of geometrical contact. There were no flashes of light which played across between the cusps at any time. Finally, at a critical moment geometrical contact seemed to be well seen and time was noted accordingly. I made a signal with my hand to two students, Mr. RALPH BRANN and Miss NAN MCFARLAND, when I was sure that the second contact had not yet come, and another

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signal when it was certainly past. The means of their records showed that these signals were made, respectively, 3ˢ.8 before and 6ˢ.8 after the observed time of contact.

During the transit the planet was looked for occasionally to detect evidences of atmosphere, or possible satellites, or shadings on the disk. The definition varied from very bad to fair. At times when the seeing was very poor the planet was surrounded by a broad, boiling penumbra which closely resembled Fig. 159 in Vol. I of CHAMBERS'S Astronomy. When the seeing was good, the disk was of a uniform intense blackness and was as sharp edged as if it had been cut out of sheet metal with a punch. Satellites were suspected about noon, but proved to be minute spots on the Sun. Mercury's disk was darker than the umbra of the Sun spots.

Dense clouds obscured the Sun just before the time of third contact, but opened somewhat at the desired moment and closed again when the planet had vanished. As Mercury drew near to the Sun's limb the definition was superb, but there was no time to put on a high magnifying power. For some seconds before third contact there was a slight darkening of the solar surface between the limb of the Sun and the advancing edge of the planet. Two or three seconds possibly before internal contact a minute black drop, resembling the one shown in the figure in the upper left-hand corner of Plate XXII, facing page 350 of Vol. I of CHAMBERS'S Astronomy, was formed, but did not interfere with the observation of contact, which was judged to be extremely satisfactory. "Not yet," and "past" were indicated by motions of my hand, and were noted by Mr. THOMAS SHAFFER and Miss LAPHAM at 15ˢ.8 before and 10ˢ.1 after the time of contact, which I noted by listening to Mr. ANTRAM'S counting, as in the forenoon. But these intervals are not to be taken as representing the limits of error of the observation of internal contact. At the time of the last contact the Sun's limb was undulating a trifle and the observation was a little less satisfactory than that of the preceding contact. The records of "not yet," and "past," by Mr. SHAFFER and Miss LAPHAM were, respectively, 11ˢ.1 before 5ˢ.0 after my record of contact, made by listening to Mr. ANTRAM'S counting. The means of Mr. SHAFFER'S and Miss LAPHAM'S results are given in each instance. Two times of disappearance were noted, one 3ˢ before the other. The first one was caused by an undulation of the Sun's limb, which temporarily obliterated the small notch. The time given for fourth contact at the beginning of this paper is that at which the notch was last seen. It was then extremely small, but of the right shape, and so clearly defined that I could not consider it as caused by an atmospheric undulation.

II. HERBERT E. RUSSELL, associate professor of mathematics in the University of Denver, made the following observations with the equatorial of the Students' Observatory:

Station, University Park, Colo.; latitude +39° 40′ 35″.1, longitude 1ʰ 51ᵐ 35ˢ.73 west of Washington; elevation above sea level, 5,400± feet.

The instrument used was a 6-inch GRUBB equatorial, eyepiece, HERSCHELIAN, with power of 99 diameters.

The timepiece was a FAUTH mean time clock, connected with the chronograph. Error of timepiece as determined by comparison with FRODSHAM No. 2593: at first and second contacts, 13ˢ.94 slow; at third and fourth contacts, 14ˢ.08 slow.

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[Civil Time.]

Contacts.	Observed Mean Time.	Reduced Local Mean Time.
	h m s	h m s
First	8 57 21.0 a. m.	8 57 34.9 a. m.
Second	8 58 36.9 a. m.	8 58 50.8 a. m.
Third	2 10 59.1 p. m.	2 11 13.2 p. m.
Fourth	2 12 49.3 p. m.	2 13 3.4 p. m.

Professor RUSSELL made the following notes about the contacts:

"Owing to uncertainty as to just where to look for Mercury and to indistinctness in the outline of the Sun's limb, the first contact was not noted until Mercury was a quarter to a third of its diameter on the Sun. As it passed from first to second contact, no ring of light was observable. Before third contact the black drop seemed to form suddenly, and contact was noted soon after. Clouds partially obscured the Sun at time of fourth contact, so that there was some uncertainty as to that observation.

"No ring of light was seen around Mercury between third and fourth contacts. Mercury became invisible immediately after fourth contact."

Professor RUSSELL'S records were chronographic. HORACE W. AVERY and JOHN R. SWENSON, listening to a sounder actuated electrically by the FAUTH mean time clock, noted the times when Professor RUSSELL called "not," "time," and "past." The means of their results are as follows:

Second contact: "Not," $2^s.4$ before "time;" "past," $3^s.8$ after "time."

Third contact: "Not," $5^s.7$ before "time;" "past," $25^s.8$ after "time."

At fourth contact "not" was not called and "past" was noted by Mr. AVERY as 11^s after "time." Professor RUSSELL had an impression that he noted the third contact too early.

III. Mrs. HERBERT A. HOWE used the 5-inch finder of the 20-inch equatorial, equipped with a HERSCHELIAN eyepiece magnifying 120 diameters. Her timepiece was the FAUTH sideral clock of the observatory, connected with a chronograph. In the morning the chronograph pen worked badly and there was no indubitable record of her observations. In the afternoon the clock was $5^s.7$ slow.

Contact.	Observed Sidereal Time.	Reduced Local Mean Time.
	h m s	h m s
Third	17 31 35.0	2 11 39 p. m.
Fourth	17 32 50.7	2 12 54 p. m.
"Past"	17 32 59.7	2 13 3 p. m.

The time noted for fourth contact is to be regarded as early, as Mrs. HOWE saw the notch again before she made the record "past."

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OBSERVATIONS MADE AT THE NAVY-YARD OBSERVATORY, MARE ISLAND, CAL.

Report of Lieut. W. E. SEWELL, U. S. N.

The geographic latitude is +38° 5′ 56″, longitude 122° 16′ 19″ west of Greenwich.

Used full aperture of a 5-inch equatorial telescope by CLARK, No. 861, with a magnifying power of 160 diameters.

The times of contacts were registered on the chronograph with the standard clock. Good sights on eight time stars and two azimuth stars were observed on the evening of November 9 with the transit instrument. The rate of the clock had not changed.

The first and second contacts were not observed on account of fog. The third contact was quite satisfactory, the time being noted when the line of light between edges of planet and Sun was broken. The fourth contact was not so satisfactory, but I consider it fair. On account of the difficulty of distinguishing the indentations when small, the fourth contact may have been marked a few seconds early.

Contact.	Standard Clock Time.			Red. to 120th Meridian +Clock Error.			120th Meridian Time.		
	h	m	s	h	m	s	h	m	s
Third	1	2	44.7	0	8	52.0	1	11	36.7
Fourth	1	4	18.4	0	8	52.0	1	13	10.4

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OBSERVATIONS MADE AT THE OBSERVATORY OF PROF. GEORGE DAVIDSON, SAN FRANCISCO, CAL.

I. Report of Prof. GEORGE DAVIDSON.

I prepared to observe the transit of Mercury by getting telescopes in good order and observing transits of stars before for error and rate of chronometers. I was prepared to observe with my equatorial 6.4-inch objective; FREMONT MORSE, assistant, and CHARLES B. HILL, formerly of the Coast Survey and later of Lick Observatory, to observe with the two 3-inch FRAUNHOFER telescopes. I had a fourth of my own for another observer. The morning was unfortunately foggy, and when it cleared away and there was no wind from the ocean the atmosphere became very unsteady. I was not satisfied with my own observations, because the images of Sun and planet were very unsteady and I had too high a power.

During the progress of the transit I looked many times at the planet through the FRAUNHOFER with dark red image of the Sun.

On one occasion I saw a very faint whitish aureola around the planet, fully one diameter in breadth and not brighter, but in contact with Mercury, and also a very faint whitish nebulous center to the planet. It was the first time I had ever seen such a phenomenon in transits of Mercury and Venus, and I changed my position several times to be sure of the exhibition. I attributed it to the atmospheric conditions. The air was very unsteady at times, and there was little or no wind.

I observed the meridian passages of the Sun and planet with the Coast Survey transit instrument.

II. Report of FREMONT MORSE.

I observed the third and fourth contacts of the transit of Mercury at the DAVIDSON Observatory. Fog prevented the observation of the first and second contacts, and I did not go to the Observatory until about an hour and a half before the end of the transit.

The instrument used was one of the large reconnoitering telescopes of the Coast and Geodetic Survey, having an aperture of 3 inches and a power of 105. A dark-yellow glass gave a very satisfactory shade, the image of the Sun being neither too bright nor too dark.

The atmosphere was unsteady, but with the low power used the disturbance was not so great as to cause much trouble.

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The recorded and reduced times are as follows:

Contact.	Mean Time. Chronometer No. 5038.	Chronometer Fast of Pacific Standard Time.	Pacific Standard Time.
	h m s	h m s	h m s
Third.....	1 20 15.5	0 8 42.6	1 11 32.9
Fourth.....	1 22 1.0	.. ..	1 13 18.4

III. Report of CHARLES B. HILL.

The transit of Mercury was observed by me at the private observatory of Prof. GEORGE DAVIDSON in San Francisco, the geographic position of which may be found in the American Ephemeris for 1897. I used the FRAUNHOFER telescope, on tripod stand, aperture 3 inches, power about 120 diameters, and with a deep red shade-glass.

Sidereal chronometer, No. 1739, used in these observations was 5^s.1 slow of local sidereal time, as determined by comparisons before and after contact with the standard chronometer of the United States Coast and Geodetic Survey Observatory.

In the morning a dense fog prevented all possible chance of obtaining first and second contacts. At egress the sky was clear, but the atmosphere was very unsteady, and while the contacts were observed as well as the conditions would permit, they are not very satisfactory.

The contacts as noted by the chronometer are:

Contact.	Sidereal Time.	
	h m s	
Third.....	16 21 20	Not yet.
	16 21 40	Not yet.
	16 21 51?	Contact.
	16 22 3	Past.
Fourth.....	16 23 22	Doubtful.
	16 23 31	Gone.

Assuming that the instant marked "contact" and the mean of the two last times recorded represent, respectively, the best values for three and four to be obtained from these observations, and reducing to Pacific Standard Time, we have—

Contact.	Pacific Standard Time.
	h m s
Third.....	1 11 36.8 p. m.
Fourth.....	1 13 12.1 p. m.

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OBSERVATIONS MADE AT THE CHABOT OBSERVATORY, OAKLAND, CAL.

Report of CHARLES BURCKHALTER, Assistant in Charge.

I observed the third and fourth contacts of the transit of Mercury with the 8½-inch CLARK equatorial of this observatory, using a power of 200 for both contacts. The first and second contacts were not observed here on account of a dense low fog, the Sun being invisible until 9.30 a. m.

The seeing was fair for the third contact and poor for the fourth. I therefore consider the fourth subject to correction to the amount of 3 to 5 seconds.

The times were as follows:

Contact.	Pacific Standard Time.		
	h	m	s
Third.....	1	11	39.0
Fourth.....	1	13	18.5

The latitude of this observatory is $+37^\circ\ 48'\ 5''$, longitude $8^h\ 9^m\ 6^s.62$ west of Greenwich.

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OBSERVATIONS MADE AT THE UNIVERSITY OF THE PACIFIC OBSERVATORY, COLLEGE PARK, CAL.

Description of station.—The Jacks-Goodal Observatory of the University of the Pacific, situated about 1½ miles from the center of San Jose, on level ground about 85 feet above high-water mark; latitude $+37^{\circ}\ 20'.6 \pm 0'.1$, longitude $8^{h}\ 7^{m}\ 38^{s}.8 \pm 1^{s}.0$ west of Greenwich.

Contacts were noted by a RODGERSON chronometer regulated for sidereal time; chronometer correction November 8 at $22^{h}\ 30^{m}$ sidereal time, $+74^{s}.80$; at 1^{h} sidereal time November 12, $+79^{s}.06$. Daily rate assumed in reduction of observations to Pacific Standard Time $+1^{s}.00$.

Contacts were observed with a 6-inch ALVAN CLARK and Sons equatorial; focal length 82⅛ inches, eyepiece 140 diameters. For third and fourth contacts the objective was diaphragmed down to 3 inches clear aperture.

No comparisons were made, but in the afternoon of November 10 the chronometer corrections given above were verified by electric comparison with Mount Hamilton mean-time clock.

Contact.	Observed Sidereal Time.			Pacific Standard Time.			
	h	m	s		h	m	s
First	..	..	....		..	..	....
Second	11	9	4.0	Nov. 9	19	58	48.6
Third	16	22	40.0	10	1	11	34.3
Fourth	16	24	24.0	10	1	13	18.0

The fog interfered with the morning observations. When Mercury was first clearly seen the ring of sunlight was already complete. I estimated the error for second contact at about 10^{s} or 15^{s}. For the third and fourth contacts the air was very steady, the seeing good, and the observations as accurate as I could make them.

R. G. AITKEN, observer; E. H. YOSHIZAKI, recorder.

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OBSERVATIONS MADE AT THE MOUNT LOWE OBSERVATORY, ECHO MOUNTAIN, LOS ANGELES COUNTY, CAL.

Report of Prof. LEWIS SWIFT.

The sky was cloudless on the day of the transit. The air at commencement was good, but boiled some at the end. The black drop was also a source of error. I call the first, second, and fourth contacts good, but I am surprised at the difference as computed for San Francisco and elsewhere.

Our time was received from San Francisco in the dome room and is Pacific Standard. My latitude and longitude are not yet determined. The telescope is nearly in position, but unfortunately I have been confined to my bed. My son, EDWARD SWIFT, made the observations of the four contacts with the 16-inch contracted to 3 inches, and I the first and second with my comet seeker contracted to 2 inches. My latitude will not differ greatly from $+34° 12'\pm$; my longitude, $118° 30'\pm$ west of Greenwich.

[Civil Time.]

Contact.	Pacific Standard Time.		
	h	m	s
First	7	57	10
Second	7	58	36
Third	1	11	26
Fourth	1	13	10

A satellite was looked for, but none was seen.

NOTE.—Although mention is made of six observations of contacts, only four times are reported.

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APPENDIX III.

LIST OF PUBLICATIONS

ISSUED BY

THE UNITED STATES NAVAL OBSERVATORY, 1845–1908.

BY

WM. D. HORIGAN,
Librarian.

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INTRODUCTION.

The following List is printed in response to many requests received by the Observatory for information concerning its publications.

With the exceptions noted below, it may be said to contain the full title of every publication of the institution which has been issued in a separate form. No previous list of these publications has been found other than that of the Washington Observations and the Appendices thereto. Every title has been taken directly from the publication entered with one exception, see page D 18. Some difficulty has been experienced in determining whether certain Congressional documents written by the Superintendent were distributed by the Observatory; but only those known to have been distributed at least in part by the Navy Department have been included. Several loose plates and unstitched signatures from early publications of the institution have been found, but omitted because they were believed to be, not separate editions, but in the nature of advance sheets.

The subarrangement is chronological, except in the case of the Wind and Current Charts which are grouped first by oceans, then by series, and finally by sheet numbers.

With reference to the Washington Observations, it should be stated that the volumes for 1845, 1846, 1847, 1848, and 1849–50 bore the volume numbers I, II, III, IV, and V, upon the respective title-pages. From that time no volume numbers were used until the publication of the volume for 1875. The volumes for 1875 to 1882 were numbered upon the backs, but not on the title-pages, as XXII to XXIX, respectively. Before the volume for 1875 there had been only twenty volumes issued, but as Appendix II, reprinted from the volume for 1871, contained the results of observations made during the period from 1853 to 1860, for which years no volume had been issued, it was counted in as Volume VII of the series. From 1883 to the end of the series no volume numbers were used.

The Meteorological Observations for 1867 to 1871 and 1879 were never reprinted, but can be found in the Washington Observations for those years, respectively.

Of the Reports of the Superintendent not to be found in the list, some of the earlier ones were never printed. What might be called the annual report for 1846 is in the Appendix to the Washington Observations for 1845. The reports for 1847, 1851 to 1853, 1855 to 1861, 1863 to 1901, and 1903 to 1905, are in the Reports of the Secretary of the Navy, which have always been Congressional documents. The Reports of the Superintendent for 1869 to 1892 are also in the annual volumes of the Washington Observations.

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There may be omissions of minor importance under the subhead of Sailing Directions, etc., for upon the establishment of the Hydrographic Office 540 volumes from the library of the Observatory, the charts, sailing directions, and similar aids to navigation, then in stock, were transferred to the said office. Nearly all of the Wind and Current Charts here listed were kindly loaned for the purpose by the Librarian of Congress and the Hydrographer of the Navy. The highest marginal number found upon these charts was 129, and it is supposed to be the highest number so used. Of these numbers, the following have not been found upon any of the charts: 26–30, 39–42, 44, 45, 49, 76, 77, 83–115, 121–124, and 126–128. There is further reference to them in the Key on page D 28. The seal engraved upon these charts shows a foul anchor, erect, with a spread eagle perched on stock and surrounded by thirteen stars, all within a circular border with the legend, "United States Hydrographical Office." The dimensions of these and all other maps in the List have been taken from the outer edges of the borders, excluding the margins.

Of the specifications, regulations, and most of the mathematical and astronomical tables, only a few copies were printed, as they were not for general distribution.

The list of special reports, observations, etc., is no doubt incomplete, but it is believed to contain every publication of importance.

The works entered under the U. S. Naval Astronomical Expedition to the Southern Hemisphere and the Transit of Venus Commission were in no sense publications of the Observatory; they were only distributed through its agency.

The publications of the Nautical Almanac Office are not included.

In explanation of the various names by which the institution has been designated in its publications, it should be stated that from 1830 to 1844 it was officially known as the Depot of Charts and Instruments; from 1844 to 1854 the names Naval Observatory and National Observatory were used indifferently, sometimes in the same publication. In December, 1854, the Secretary of the Navy directed that it should thereafter be styled the United States Naval Observatory and Hydrographical Office, and as such it was known until the establishment of the Hydrographic Office in 1866. Since then the official name of the institution has been the United States Naval Observatory. From 1830 to 1842 the institution was under the Board of Commissioners for the Navy; from 1842 to 1862 it was under the Bureau of Ordnance and Hydrography; from 1862 to 1889 it was under the Bureau of Navigation, and since 1889 it has been under the Bureau of Equipment.

The asterisk signifies that there are no copies of the publication available for distribution.

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LIST OF PUBLICATIONS.

PUBLICATIONS OF THE DEPOT OF CHARTS AND INSTRUMENTS.

*Magnetical and Meteorological Observations made at Washington under orders of the Hon. Secretary of the Navy, dated August 13, 1838, by Lieutenant J. M. Gilliss, U. S. N. Printed by order of the Senate of the United States.

Washington, Gales and Seaton, printers, 1845.

22 pl., 28 p. including blank f.+648 p. 22½ cm.

Published as 28th Cong., 2d sess., Senate Doc., Vol. 10, No. 172. [Pt. 2]. In the copies examined, the only difference noted is that those distributed by Congress are printed on a thinner paper than those distributed by the Department.

The magnetical observations were made from 1840 to 1842, and the meteorological observations from 1838 to 1842, inclusive.

*Astronomical Observations made at the Naval Observatory, Washington [1838–1842], under orders of the Honorable Secretary of the Navy, dated August 13, 1838. By Lieutenant J. M. Gilliss, U. S. N. Printed by order of the Senate of the United States.

Washington, Gales and Seaton, printers, 1846.

1 pl., 25+671 p. 23 cm.

Published as 28th Cong., 2d sess., Senate Doc., Vol. 10, No. 172 [Pt. 1]. In the copies examined, no difference has been noted between the Congressional copies and those distributed by the Department.

*Catalogue of twelve hundred and forty-eight stars observed at Washington, between October, 1838, and July, 1842, reduced to the middle epoch, January 1, 1840, and compared in right ascension with the mean places of the British Association Catalogue.

[Washington, Gales and Seaton, printers,] 1846.

[591]–671 p. 23 cm.

Also in the preceding volume.

ANNUAL VOLUMES OF THE WASHINGTON OBSERVATIONS.

*Astronomical Observations made during the year 1845 at the National Observatory, Washington: under the direction of M. F. Maury, A. M., lt. United States Navy, superintendent. Vol. I. Published by authority of the Hon. Geo. Bancroft, Secretary of the Navy.

Washington, printed by J. & G. S. Gideon, 1846.

12 engr. blank forms+13 pl., engr. t.-p.+5+156+273+119 p. 28½ cm.

Engraved title reads:

Astronomical Observations made under the direction of M. F. Maury, lieut. U. S. Navy, during the year 1845 at the U. S. Naval Observatory, Washington. [Vignette of Observatory.] Vol. I. Published by authority of the Secretary of the Navy.

Washington, J. & G. S. Gideon, printers, 1846.

*Astronomical Observations made during the year 1846 at the National Observatory, Washington: under the direction of M. F. Maury, lieut. United States Navy, superintendent. Commodore L. Warrington, Chief of the Bureau of Ordnance and Hydrography. Vol. II. Published by authority of the Hon. Wm. A. Graham, Secretary of the Navy.

Washington, C. Alexander, printer, 1851.

Engr. t.-p.+2 f.+65+441+167 p. 28½ cm.

Engraved title reads:

Astronomical Observations made under the direction of M. F. Maury, lieut. U. S. Navy, during the year 1846 at the National Observatory, Washington. [Vignette of Observatory.] Vol. II. Published by authority of the Secretary of the Navy.

Washington, C. Alexander, printer, 1851.

*Astronomical Observations made during the year 1847 at the National Observatory, Washington: under the direction of M. F. Maury, LL. D., lieut. United States Navy, superintendent. Commodore L. Warrington, Chief of Bureau of Ordnance and Hydrography. Vol. III. Published by authority of the Hon. J. C. Dobbin, Secretary of the Navy.

Washington, C. Alexander, printer, 1853.

45 pl., engr. t.-p.+2 f.+37+323+118 p. 28½ cm.

Engraved title reads:

Astronomical Observations made under the direction of M. F. Maury, lieut. U. S. Navy, during the year 1847, at the National Observatory, Washington. [Vignette of Observatory.] Vol. III. Published by authority of the Secretary of the Navy.

Washington, C. Alexander, printer, 1853.

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*Astronomical Observations made during the year 1848, at the U. S. N. Observatory, Washington, under the direction of M. F. Maury, LL. D., lieut. United States Navy, superintendent. Commodore L. Warrington, Chief of Bureau of Ordnance and Hydrography. Vol. IV. Published by authority of Hon. J. C. Dobbin, Secretary of the Navy.

Washington, A. O. P. Nicholson, public printer, 1856.

Engr. t.-p.+39+307 p. 29½ cm.

Engraved title reads:

Astronomical Observations made under the direction of M. F. Maury, lieut. U. S. Navy, during the year 1848 at the U. S. N. Observatory, Washington. Vol. IV. Published by authority of the Secretary of the Navy.

Washington, A. O. P. Nicholson, public printer, 1856.

*Astronomical Observations made during the years 1849 and 1850 at the U. S. Naval Observatory, Washington, approved by Capt. D. N. Ingraham, Chief of the Bureau of Ordnance and Hydrography, and published by authority of the Honorable Isaac Toucey, Secretary of the Navy, by M. F. Maury, LL. D., U. S. N., Superintendent of U. S. Observatory and Hydrographical Office, Washington. Volume V.

Washington, Cornelius Wendell, printer, 1859.

31+464 p.+1 f. 30 cm.

Astronomical Observations made at the U. S. Naval Observatory, during the years 1851 and 1852. Published by authority from the Hon. Secretary of the Navy. Prepared for publication under direction of Capt. J. M. Gilliss, U. S. N., superintendent.

Washington, 1867.

26 p.+1 f.+652 p. 29 cm.

Results of observations made . . . with the transit instrument and mural circle in the years 1853 to 1860. See Washington Observations, 1871, Appendix II.

*Astronomical and Meteorological Observations made at the United States Naval Observatory, during the year 1861. Published by authority from the Hon. Secretary of the Navy. Commander J. M. Gilliss, U. S. N., superintendent.

Washington, Government Printing Office, 1862.

1 pl., [illegible] p. 28½ cm.

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1862. Published by authority from the Hon. Secretary of the Navy. Captain J. M. Gilliss, U. S. N., superintendent.

Washington, Government Printing Office, 1863.

[illegible] p.+1 f. 28½ cm.

*Astronomical and Meteorological Observations, made at the United States Naval Observatory during the year 1864. Published by authority from the Hon. Secretary of the Navy. Captain J. M. Gilliss, U. S. N., superintendent.

Washington, Government Printing Office, 1865.

[illegible] cm.

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1864. Published by authority of the Hon. Secretary of the Navy. Captain J. M. Gilliss, U. S. N., superintendent.

Washington, Government Printing Office, 1866.

47+523 p. 28½ cm.

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1865. Published by authority of the Hon. Secretary of the Navy. Rear-Admiral Charles Henry Davis, U. S. N., superintendent.

Washington, Government Printing Office, 1867.

8 pl., 41+47+29 p.+1 blank f.+550 p. 29 cm.

Engraved seal of the Observatory on p. [XXXVIII.]

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1866. Published by authority of the Hon. Secretary of the Navy. Rear-Admiral Charles H. Davis, U. S. N., superintendent.

Washington, Government Printing Office, 1868.

2 pl., 48 p.+1 f.+29+472 p.+1 f. 28½ cm.

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1867. Published by authority of the Hon. Secretary of the Navy. Commodore B. F. Sands. U. S. N., superintendent.

Washington, Government Printing Office, 1870.

12 pl., 39+487+54+5 p.+1 f.+218+46+38 p. 29½ cm.

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1868. Published by authority of the Hon. Secretary of the Navy. Commodore B. F. Sands, U. S. N., superintendent.

Washington, Government Printing Office, 1871.

39+494+73 p. 30 cm.

*Astronomical and Meteorological Observations made at the United States Naval Observatory during the year 1869. Published by authority of the Hon. Secretary of the Navy. Commodore B. F. Sands, U. S. N., superintendent.

Washington, Government Printing Office, 1872.

2 pl., 43+396+4 p.+2 f.+132+25+331 p. 30 cm.

*Astronomical and Meteorological Observations made during the year 1870, at the United States Naval Observatory. Rear-Admiral B. F. Sands, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1873.

1 pl., 80 p.+1 f.+326+39+49+73+13+271 p. 30 cm.

*Astronomical and Meteorological Observations made during the year 1871, at the United States Naval Observatory. Rear-Admiral B. F. Sands, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1873.

105+251+9+162+144+21+273+52 p. 29½ cm.

Has also a supplementary note of one page inserted after the introduction to Yarnall's Catalogue.

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*Astronomical and Meteorological Observations made during the year 1872, at the United States Naval Observatory. Rear-Admiral B. F. Sands, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1874.

105+371+57+22 p. 29½ cm.

*Astronomical and Meteorological Observations made during the year 1873, at the United States Naval Observatory. Rear-Admiral B. F. Sands, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1875.

106+276+58 p.+2 f.+74 p. 29½ cm.

*Astronomical and Meteorological Observations made during the year 1874, at the United States Naval Observatory. Rear-Admiral C. H. Davis, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1877.

6 pl., 1 f.+72+403+67 p.+1 f.+45+11 p. 30 cm.

*Astronomical and Meteorological Observations made during the year 1875, at the United States Naval Observatory. Rear-Admiral C. H. Davis, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1878.

Front.+2 pl., 1 f.+84+501+60 p.+2 f.+16+280+33 p. 30 cm.

On cover: Vol. XXII.

Astronomical and Meteorological Observations made during the year 1876, at the United States Naval Observatory. Rear-Admiral C. H. Davis, U. S. N., superintendent. In two parts. Part I. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1880.

1 pl., 93+5+534+63 p. 30 cm.

On cover: Vol. XXIII.

Astronomical and Meteorological Observations made during the year 1876, at the United States Naval Observatory. Rear-Admiral C. H. Davis, U. S. N., superintendent. In two parts. Part II. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1880.

59 pl., 2 f.+74 p.+1 f.+126+14+426 p. 30 cm.

On cover: Vol. XXIII.

Astronomical and Meteorological Observations made during the year 1877, at the United States Naval Observatory. Rear-Admiral John Rodgers, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1881.

85+355+21+44+22+43+12+15+144 p. 30 cm.

On cover: Vol. XXIV.

28167°—VOL 6—11——38

Astronomical and Meteorological Observations made during the year 1878, at the United States Naval Observatory. Rear-Admiral John Rodgers, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1882.

4 pl., 71+159+18+230 p.+1 f.+50 p. 30 cm.

On cover: Vol. XXV.

Astronomical and Meteorological Observations made during the year 1879, at the United States Naval Observatory. Rear-Admiral John Rodgers, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1883.

71+224+17+64+38 p. 30 cm.

On cover: Vol. XXVI.

Astronomical and Meteorological Observations made during the year 1880, at the United States Naval Observatory. Rear-Admiral John Rodgers, U. S. N., superintendent. Published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1884.

5 pl., 79+211+18+38 p. 30 cm.

On cover: Vol. XXVII.

Astronomical and Meteorological Observations made during the year 1881, at the United States Naval Observatory. Rear-Admiral John Rodgers, U. S. N., superintendent. Publication authorized by a concurrent resolution of the Forty-eighth Congress, March 2, 1885.

Washington, Government Printing Office, 1885.

75+203 p.+1 f.+21+33+27 p. 30 cm.

On cover: Vol. XXVIII. Also published as 48th Cong., 2d sess., Senate Mis. Doc. No. 71.

Astronomical and Meteorological Observations made during the year 1882, at the United States Naval Observatory. Vice-Admiral S. C. Rowan, U. S. N., superintendent. Publication authorized by a concurrent resolution of the Forty-eighth Congress.

Washington, Government Printing Office, 1885.

3 pl., 63+198+21+82+34+28 p. 30 cm.

On cover: Vol. XXIX. Also published as 48th Cong., 2d sess., Senate Mis. Doc. No. 72.

Observations made during the year 1883, at the United States Naval Observatory. Rear-Admiral R. W. Shufeldt, U. S. N., superintendent. Publication authorized by a concurrent resolution of the Forty-eighth Congress.

Washington, Government Printing Office, 1887.

9 pl., 81+230+74+67+35 p. 30 cm.

Also published as 49th Cong., 1st sess., Senate Mis. Doc. No. 152.

Observations made during the year 1884, at the United States Naval Observatory. Commodore S. R. Franklin, U. S. N., superintendent. Publication authorized by a concurrent resolution of the Forty-eighth Congress.

Washington, Government Printing Office, 1889.

95+343+26+302 p. 30 cm.

Also published as 50th Cong., 2d sess., House Mis. Doc. No. 148.

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Observations made during the year 1885, at the United States Naval Observatory. Commodore George E. Belknap, U.S.N., superintendent. Congress 51, Sess. 1. House of Representatives, Mis. Doc. No. 257.
Washington, Government Printing Office, 1891.
34 pl., 105+298+15+354+22+3+169 p. 30 cm.

Observations made during the year 1886, at the United States Naval Observatory. Commander Allan D. Brown, U.S.N., superintendent. Congress 51, Sess. 2, House of Representatives, Mis. Doc. No. 132.
Washington, Government Printing Office, 1891.
14 pl., 99+221 p.+2 f.+100 p. 30 cm.

Observations made during the year 1887, at the United States Naval Observatory. With 3 appendices and 10 plates. Captain Robert L. Phythian, U. S. N., superintendent. Congress 52, Sess. 1, House of Representatives, Mis. Doc. No. 11.
Washington, Government Printing Office, 1892.
10 pl., 89+170 p.+1 f.+37 p.+1 f.+99 p.+1 f. +261 p. 30 cm.

Observations made during the year 1888, at the United States Naval Observatory. With 2 appendices and 6 plates. Captain Robert L. Phythian, U. S. N., superintendent. Congress 52, Sess. 1, House of Representatives, Mis. Doc. No. 256.
Washington, Government Printing Office, 1892.
6 pl., 4+93+52+35+60+203+100 p. 30 cm.

Observations made during the year 1889, at the United States Naval Observatory. With one appendix. Captain Robert L. Phythian, U. S. N., superintendent. 52nd Congress, 2nd Session, House of Representatives, Mis. Doc. No. 115.
Washington, Government Printing Office, 1893.
69+111+57+73 p. 29½ cm.

Astronomical, Magnetic, and Meteorological Observations made during the year 1890, at the United States Naval Observatory. Capt. Frederick V. McNair, U. S. N., superintendent.
Washington, Government Printing Office, 1895.
1 pl., 65+99+57+67+420 p. 30 cm.
Also published as 54th Cong., 1st sess., House Doc. No. 219.

Astronomical, Magnetic, and Meteorological Observations made during the year 1891 at the United States Naval Observatory. Capt. Frederick V. McNair, U. S. N., superintendent.
Washington, Government Printing Office, 1899.
60+55+57 p. 30 cm.
Also published as 56th Cong., 1st sess., House Doc. No. 738.

Astronomical, Magnetic, and Meteorological Observations made during the year 1892, at the United States Naval Observatory. Capt. Frederick V. McNair, U. S. N., superintendent.
Washington, Government Printing Office, 1899.
31+23+63+63+287 p. 30 cm.
Also published as 56th Cong., 1st sess, House Doc. No. 739.
The departmental copies of the volumes for 1891 and 1892 were issued in one cloth cover, the binder's title reading: Washington Observations, 1891 and 1892, U. S. Naval Observatory.

PUBLICATIONS, SECOND SERIES.

Publications of the United States Naval Observatory. Second series. Volume I.
Washington, Government Printing Office, 1900.
1 f.+108+402 p. 30 cm.
Also published as 56th Cong., 2d sess., House Doc. No. 242.
Half-title: Transit circle observations of the Sun, Moon, planets, and miscellaneous stars, 1894–1899 . . . Professor A. N. Skinner, U. S. N., in charge of transit circle.

Publications of the United States Naval Observatory. Second series. Volume II.
Washington, Government Printing Office, 1902.
28+525 p. 30 cm.
Also published as 57th Cong., 1st sess., House Doc. No. 430.
Half-title: Zone observations with the nine-inch transit circle, 1894–1901. By Aaron N. Skinner, assisted by Frank B. Littell and Theo I. King.

Publications of the United States Naval Observatory. Second series. Volume III.
Washington, Government Printing Office, 1903.
2 pl., 6+21+73+16+69+9+47+75+107+9+128 p. 30 cm.
Also published as 57th Cong., 2d sess., House Doc. No. 455.
Half-titles:
Part I. Observations of Eros with the twenty-six inch equatorial, 1900–1901. By T. J. J. See, assisted by George K. Lawton.
Part II. Observations of Eros and reference stars with the nine-inch transit circle, 1900–1901. By Theo I. King, assisted by E. A. Boeger, W. M. Brown, and J. C. Hammond.
Part III. Observations of 495 zodiacal stars with the nine-inch transit circle, 1900. By W. S. Eichelberger, assisted by George K. Lawton and John C. Hammond.
Part IV. Observations with the six-inch transit circle, 1900–1901. By Milton Updegraff, assisted by Frank B. Littell and George K. Lawton.
Part V. Observations with the prime vertical transit instrument, 1882–1884. By Lieutenant R. R. Ingersoll, U. S. N., Lieutenant C. G. Bowman, U. S. N., and Ensign H. Taylor, U. S. N.

Publications of the United States Naval Observatory. Second series. Volume IV. In four parts. Parts I to III.
Washington, Government Printing Office, 1906.
6+95+321+11+217+37+128 p. 30 cm.
Also published as 59th Cong., 1st sess., House Doc. No. 842 [Pt. 1].
Half-titles:
Part I. Transit circle observations of the Sun, Moon, planets, and miscellaneous stars, 1900–1903.
Part II. Transit circle observations of the Sun, Moon, planets, and comets, 1866–1891. Revised and corrected by J. R. Eastman, professor of mathematics, U. S. N., retired.
Part III. Observations with the six-inch transit circle, 1901–1902. By Milton Updegraff, professor of mathematics, U. S. N., assisted by J. C. Hammond, H. R. Morgan, and C. W. Frederick.

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Publications of the United States Naval Observatory. Second series. Volume IV. In four parts. Part IV.

Washington, Government Printing Office, 1906.

2 diagr. in text, 78 fig. on 58 pl., 5+307+54+101+28 p. 30 cm.

Also published as 59th Cong., 1st sess., House Doc. No. 842 [Pt. 2].

Contains Appendices I–IV: see under Appendices.

Publications of the United States Naval Observatory. Second series. Volume V.

Washington, Government Printing Office, 1903.

10+443 p. 30 cm.

Also published as 59th Cong., 1st sess., House Doc. No. 843.

Half-title: Meteorological Observations and Results, 1893–1902.

APPENDICES TO THE WASHINGTON OBSERVATIONS.

*Observations on solar spots, made at the Observatory of Georgetown College, Sep. 20 to Nov. 6, 1850. By Prof. Benedict Sestini, S. J. Forty-four diagrams. From the Appendix to the Washington Astronomical Observations for 1847 [p. 1–10]).

Washington, C. Alexander, printer, 1853.

44 pl., 10 p. 28½ cm.

Called Appendix A, at the head of the half-title in the original volume.

*Observations on the Mississippi River, at Memphis, Tenn., by Robert A. Marr, U. S. N., March 1, 1850, to March 1, 1851. (From the Appendix to the Washington Astronomical Observations for 1847 [p. 11–32]).

Washington, C. Alexander, printer, 1853.

1 pl., 22 p. 28½ cm.

Called Appendix B, at the head of the half-title in the original volume.

*Tables for facilitating the reduction of the apparent right ascensions and declinations of the fixed stars to their mean places, together with a general table for annual precessions. National Observatory, Washington, M. F. Maury, LL.D., lieut. U. S. N., superintendent. [Prepared by Professors J. H. C. Coffin and J. S. Hubbard.] (From the Appendix to the Washington Astronomical Observations for 1847 [p. 33–116]).

Washington, C. Alexander, printer, 1853.

84 p. 28½ cm.

Called Appendix C, at the head of the half-title in the original volume.

*On the latitude and longitude of the U. S. Naval Observatory, Washington, and the declinations of certain circumpolar stars. By Professor Simon Newcomb, U. S. N. Appendix to the Washington Astronomical Observations for 1864 [p. XXXIX–XLVII].

[Washington, Government Printing Office, 1866?]

Cover-title+9 p. 30 cm.

The half-title reads: Appendix. Investigation of the latitude and longitude of the U. S. Naval Observatory. Washington. and of the declinations of certain circumpolar stars. By Professor Simon Newcomb, U. S. N.

*Description of the transit circle of the United States Naval Observatory, with an investigation of its constants. Prepared by order of Rear-Admiral Charles Henry Davis, U. S. N., superintendent. By Simon Newcomb, professor of mathematics, U. S. N. ([Washington Observations for 1865] Appendix I.)

Washington, Government Printing Office, 1867.

8 pl., 3 f.+50 p. 29 cm.

*Investigation of the distance of the Sun, and of the elements which depend upon it, from the observations of Mars, made during the opposition of 1862, and from other sources. By Simon Newcomb, professor of mathematics, U. S. Navy. ([Washington Observations for 1865] Appendix II.)

Washington, Government Printing Office, 1867.

1 f.+29 p. 29½ cm.

*Discussion of meteorological phenomena observed at the U. S. Naval Observatory, Washington, from June 30, 1842, to January 1, 1867. Prepared by order of Commodore B. F. Sands, U. S. Navy, superintendent. By J. R. Eastman, professor of mathematics, U. S. Navy. ([Washington Observations for 1866] Appendix I.)

Washington, Government Printing Office, 1868.

2 pl., 1 f.+29 p. 30 cm.

*Report on the difference of longitude between Washington and Havana. By William Harkness, professor of mathematics, U. S. Navy. Prepared at the U. S. Naval Observatory, by order of Commodore B. F. Sands, U. S. N., superintendent. ([Washington Observations for 1867] Appendix I.)

Washington, Government Printing Office, 1870.

54 p. 29½ cm.

*Reports on observations of the total eclipse of the Sun, August 7, 1869. Conducted under the direction of Commodore B. F. Sands, U. S. N., Superintendent of the U. S. Naval Observatory, Washington, D. C. ([Washington Observations for 1867] Appendix II.)

Washington, Government Printing Office, 1869.

12 pl., 5 p.+1 f.+214 p. 30 cm.

Reprinted in 1870, through a concurrent resolution of Congress, with the errata corrected, and the words Appendix II omitted from head of title.

*Positions of fundamental stars deduced from observations made at the U. S. Naval Observatory between the years 1862 and 1867. By Simon Newcomb, professor of mathematics, U. S. Navy. Prepared at the U. S. Naval Observatory, by order of Commodore B. F. Sands, U. S. N., superintendent. ([Washington Observations for 1867] Appendix III.)

Washington, Government Printing Office, 1870.

31 p. 30½ cm.

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*Catalogue of 151 stars in Præsepe, by Asaph Hall, professor of mathematics, U. S. N. Prepared at the U. S. Naval Observatory, by order of Commodore B. F. Sands, U. S. N., superintendent. ([Washington Observations for 1867] Appendix IV.)

Washington, Government Printing Office, 1870.

38 p. 31 cm.

*A catalogue of 1963 stars reduced to the beginning of the year 1850, together with a catalogue of 290 double stars. The whole from observations made at Santiago, Chili, during the years 1850–'51–'52, by the U. S. Naval Astronomical Expedition to the Southern Hemisphere. Lieut. James M. Gilliss, LL. D., superintendent; Lieut. Archibald MacRae, Master S. Ledyard Phelps, Captain's Clerk E. R. Smith, assistants. Published by the U. S. Naval Observatory, Commodore B. F. Sands, U. S. N., superintendent. (Washington Observations for 1868, Appendix I.)

Washington, Government Printing Office, 1870.

73 p. 29½ cm.

Embraces the results of all the observations which were to have been contained in the U. S. Naval Astronomical Expedition to the Southern Hemisphere, Vol. IV.

*Reports on observations of the total solar eclipse of December 22, 1870. Conducted under the direction of Rear-Admiral B. F. Sands, U. S. N., Superintendent of the U. S. Naval Observatory, Washington, D. C. (Washington Observations for 1869, Appendix I.)

Washington, Government Printing Office, 1871.

2 pl., 4 p.+2 f.+132 p. 30 cm.

*Zones of stars observed at the United States Naval Observatory with the mural circle in the years 1846, 1847, 1848, and 1849. By Professor J. H. C. Coffin, U. S. N., Lieutenant T. J. Page, U. S. N., Lieutenant Charles Steedman, U. S. N. Published by authority of the Hon. Secretary of the Navy. Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1869, Appendix II.)

Washington, Government Printing Office, 1872.

25+331 p. 30 cm.

Report on the difference of longitude between Washington and St. Louis. By William Harkness, professor of mathematics, U. S. Navy. Prepared at the U. S. Naval Observatory by order of Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1870, Appendix I.)

Washington, Government Printing Office, 1872.

39 p. 29½ cm.

Reports on observations of Encke's comet during its return in 1871. By Asaph Hall and Wm. Harkness, professors of mathematics, U. S. Navy Prepared at the U. S. Naval Observatory by order of Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1870, Appendix II.)

Washington, Government Printing Office, 1872.

1 pl., 49 p. 30 cm.

On the right ascensions of the equatorial fundamental stars and the corrections necessary to reduce the right ascensions of different catalogues to a mean homogeneous system. By Simon Newcomb, professor of mathematics, United States Navy. Prepared at the U. S. Naval Observatory by order of Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1870, Appendix III.)

Washington, Government Printing Office, 1872.

73 p. 29½ cm.

Zones of stars observed at the United States Naval Observatory with the meridian transit instrument in the years 1846, 1847, 1848, and 1849. By Professor Reuel Keith, U. S. N., Professor Mark H. Beecher, U. S. N., Professor Joseph S. Hubbard, U. S. N., Lieutenant John J. Almy, U. S. N., Lieutenant William A. Parker, U. S. N. Published by authority of the Hon. Secretary of the Navy. Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1870, Appendix IV.)

Washington, Government Printing Office, 1872.

13+271 p. 30 cm.

*Zones of stars observed at the United States Naval Observatory with the meridian circle in the years 1847, 1848, and 1849. By Professor James Major, U. S. N., Lieutenant Lafayette Maynard, U. S. N., Lieutenant William B. Muse, U. S. N. Published by authority of the Hon. Secretary of the Navy. Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1871, Appendix I.)

Washington, Government Printing Office, 1873.

9+162 p. 30 cm.

*Results of observations made at the United States Naval Observatory with the transit instrument and mural circle in the years 1853 to 1860, inclusive. By Prof. M. Yarnall, U. S. N., Prof. James Major, U. S. N., Prof. T. J. Robinson, U. S. N. Prepared by Prof. M. Yarnall, U. S. N., by order of Rear-Admiral B. F. Sands, U. S. N., Superintendent U. S. Naval Observatory. Published by authority of the Hon. Secretary of the Navy. (Washington Observations for 1871, Appendix II.)

Washington, Government Printing Office, 1872

144 p. 30 cm.

Sometimes called the Washington Observations for 1853–60, or Vol. VII, since it contains the results of work done in those years.

*Catalogue of stars observed at the United States Naval Observatory during the years 1845 to 1871, and prepared for publication by Professor M. Yarnall, U. S. N., by order of Rear-Admiral B. F. Sands, U. S. N., superintendent. (Washington Observations for 1871, Appendix III.)

Washington, Government Printing Office, 1873.

21+273 p. 30 cm.

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*Memoir of the founding and progress of the United States Naval Observatory. "Founded A. D. 1842. John Tyler, President of the U. S. Abel P. Upshur, Secretary of the Navy." *Inscription on the tablet over the door of the Observatory.* Prepared at the U. S. Naval Observatory by Professor J. E. Nourse, U. S. N., by order of Rear-Admiral B. F. Sands, U. S. N., Superintendent of U. S. Naval Observatory. (Washington Observations for 1871, Appendix IV.)

Washington, Government Printing Office, 1873.

52 p. 30 cm.

*Tables of instrumental constants and corrections for the reduction of transit observations made at the U. S. Naval Observatory. Prepared by Professor John R. Eastman, U. S. N. (Washington Observations for 1872, Appendix I.)

Washington, Government Printing Office, 1873.

57 p. 30 cm.

*Report on the difference of longitude between Washington and Detroit, Michigan; Carlin, Nevada; and Austin, Nevada. By J. R. Eastman, professor of mathematics, United States Navy. (Washington Observations for 1872, Appendix II.)

Washington, Government Printing Office, 1874.

22 p. 29½ cm.

*The Uranian and Neptunian systems investigated with the 26-inch equatorial of the United States Naval Observatory. By Simon Newcomb, LL. D., professor, United States Navy. (Washington Observations for 1873, Appendix I.)

Washington, Government Printing Office, 1875.

74 p. 29½ cm.

*Instruments and publications of the United States Naval Observatory. "Founded A. D. 1842. John Tyler, President of the U. S. Abel P. Upshur, Secretary of the Navy." *Inscription on the tablet over the door of the Observatory.* Published by authority of the Hon. Secretary of the Navy. Rear-Admiral C. H. Davis, superintendent. [Washington Observations for 1874, Appendix I.]

Washington, 1845–1876 [1876].

Front.+6 pl., 1 f.+45 p. 30 cm.

Written by Professors M. Yarnall, J. E. Nourse, J. R. Eastman, and E. S. Holden.

*Report on the difference of longitude between Washington and Ogden, Utah. By J. R. Eastman, professor of mathematics, United States Navy. (Washington Observations for 1874, Appendix II.)

Washington, Government Printing Office, 1876.

11 p. 29½ cm.

Report on the difference of longitude between the U. S. Naval Observatory and the Sayre Observatory of Lehigh University. By J. R. Eastman, professor of mathematics, United States Navy. (Washington Observations for 1875, Appendix I.)

Washington, Government Printing Office, 1878.

1 pl., 19 p.+1 f. 29 cm.

Researches on the motion of the Moon made at the United States Naval Observatory, Washington. By Simon Newcomb, professor, U. S. Navy.—Part I. Reduction and discussion of observations of the Moon before 1750. (Washington Observations for 1875, Appendix II.)

Washington, Government Printing Office, 1878.

280 p. 29½ cm.

*Chronometer rates as affected by change of temperature and other causes. By Lieutenant-Commander C. H. Davis, jr., U. S. N., in charge of chronometers at the U. S. N. Observatory. (Washington Observations for 1875, Appendix III.)

Washington, Government Printing Office, 1878.

2 pl., 33 p. 29½ cm.

*A subject-index to the publications of the United States Naval Observatory, 1845–1875. By Edward S. Holden, professor of mathematics, United States Navy. (Washington Astronomical Observations for 1876, Appendix I.)

Washington, Government Printing Office, 1879.

74 p. 29½ cm.

Reports on telescopic observations of the transit of Mercury, May 5–6, 1878. (Washington Observations, 1876, Appendix II.)

Washington, Government Printing Office, 1879.

1 pl., 1 f.+126 p. 29½ cm.

Reports on the total solar eclipses of July 29, 1878, and January 11, 1880. Issued by the United States Naval Observatory. (Washington Observations for 1876, Appendix III.)

Washington, Government Printing Office, 1880.

58 pl., 14+426 p. 30 cm.

Investigation of the objective and micrometers of the twenty-six inch equatorial, constructed by Alvan Clark & Sons. By Edward S. Holden, professor of mathematics, U. S. Navy. (Washington Observations for 1877, Appendix I.)

Washington, Government Printing Office, 1881.

44 p. 29½ cm.

The multiple star Σ 748. By Edward S. Holden, professor of mathematics, U. S. Navy. (Washington Observations for 1877, Appendix II.)

Washington, Government Printing Office, 1881.

1 f.+22 p. 29½ cm.

A value of the solar parallax from meridian observations of Mars at the opposition in 1877. By J. R. Eastman, professor of mathematics, United States Navy. (Washington Observations for 1877, Appendix III.)

Washington, Government Printing Office, 1881.

43 p. 29½ cm.

*Report on the determination of the longitude of the Cincinnati Observatory at Mount Lookout, Hamilton County, Ohio. By J. R. Eastman, professor of mathematics, United States Navy, and Ormond Stone, A. M., Director of the Cincinnati Observatory. (Washington Observations for 1877, Appendix IV.)

Washington, Government Printing Office, 1880.

12 p. 29½ cm.

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The longitude of the Morrison Observatory, Glasgow, Mo. By J. R. Eastman, professor of mathematics, United States Navy, and Henry S. Pritchett, A. M., astronomer at Morrison Observatory . . . (Washington Observations for 1877, Appendix V.)
Washington, Government Printing Office, 1881.
15 p. 29½ cm.

Observations of double stars made at the United States Naval Observatory by Asaph Hall, professor of mathematics, United States Navy. Rear-Admiral John Rodgers, U. S. N., superintendent. [Washington Observations for 1877, Appendix VI.]
Washington, Government Printing Office, 1881.
144 p. 29½ cm.

*Monograph of the central parts of the Nebula of Orion. R. A. $5^h\ 28^m\ 24^s.0$; N. P. D. 95° 29′ 10″.9; 1860.0. By Edward S. Holden, professor of mathematics, U. S. Navy. (Washington Astronomical Observations for 1878, Appendix I.)
Washington, Government Printing Office, 1882.
Front.+3 pl., 230 p. 29½ cm.

*The longitude of the Observatory of the John C. Green School of Science, Princeton, N. J. By Henry M. Paul, assistant astronomer, United States Naval Observatory, and Professor C. A. Young. (Washington Observations for 1878, Appendix II.)
Washington, Government Printing Office, 1881.
1 f.+50 p. 29½ cm.

The parallax of α Lyræ and 61 Cygni. By Asaph Hall, professor of mathematics, U. S. Navy. Rear-Admiral John Rodgers, U. S. Navy, Superintendent of Naval Observatory. ([Washington Observations for 1879] App. I.)
Washington, Government Printing Office, 1882.
64 p. 29½ cm.

*A determination of the semi-diameter of the Moon from two occultations of the Pleiades, observed on July 6, 1877, and September 6, 1879. By H. M. Paul, assistant astronomer at the U. S. Naval Observatory. (Washington Observations for 1879, Appendix II.)
Washington, Government Printing Office, 1883.
38 p. 29½ cm.

Observations of the great comet of 1882, made at the United States Naval Observatory. Rear-Admiral R. W. Shufeldt, U. S. N., superintendent. Prepared by William C. Winlock, assistant astronomer. (Washington Observations for 1880, Appendix I.)
Washington, Government Printing Office, 1883.
5 pl., 38 p. 29½ cm.

*The orbits of Oberon and Titania, the outer satellites of Uranus. By Asaph Hall, professor of mathematics, United States Navy. ([Washington Observations] Appendix I, 1881.)
Washington, Government Printing Office, 1885.
33 p. 29½ cm.

*Orbit of the satellite of Neptune. By Asaph Hall, professor of mathematics, United States Navy. ([Washington Observations] Appendix II, 1881.)
Washington, Government Printing Office, 1885.
27 p. 29½ cm.

*The orbit of Iapetus, the outer satellite of Saturn. By Asaph Hall, professor of mathematics, United States Navy. (Washington Observations for 1882, Appendix I.)
Washington, Government Printing Office, 1885.
82 p. 29½ cm.

Annular eclipse of the Sun, March 15–16, 1885. By Allan D. Brown, commander U. S. Navy, and Albert G. Winterhalter, ensign, U. S. Navy. ([Washington Observations] Appendix II, 1882.)
Washington, Government Printing Office, 1885.
3 pl., 34 p. 29½ cm.

On the flexure of meridian instruments and the means available for eliminating its effects from star places. By William Harkness, professor of mathematics, United States Navy. (Appendix III to the Washington Observations for 1882.)
Washington, Government Printing Office, 1886.
28 p. 29½ cm.

*The six inner satellites of Saturn. By Asaph Hall, professor of mathematics, United States Navy. (Washington Observations for 1883, Appendix I.)
Washington, Government Printing Office, 1886.
74 p. 28½ cm.

Observations for stellar parallax. By Asaph Hall, professor of mathematics, United States Navy. (Washington Observations for 1883, Appendix II.)
Washington, Government Printing Office, 1886.
67 p. 29½ cm.

The Observatory temperature room and competitive trials of chronometers in 1884 and 1886. Report by the Superintendent to the Chief of the Bureau of Navigation. (Washington Observations for 1883, Appendix III.)
Washington, Government Printing Office, 1886.
9 pl., 35 p. 29½ cm.

Catalogue of stars observed at the United States Naval Observatory during the years 1845 to 1877, and prepared for publication by Professor M. Yarnall, U. S. N. 3rd edition, revised and corrected, with renumbering of the stars, by Professor Edgar Frisby, U. S. N. ([Washington Observations] Appendix I, 1884.)
Washington, Government Printing Office, 1889.
26+302 p. 30 cm.

The International Astrophotographic Congress and a visit to certain European observatories and other institutions: report to the superintendent. By Albert G. Winterhalter, lieutenant, United States Navy . . . (Washington Observations for 1885, Appendix I.)
Washington, Government Printing Office, 1889.
31 pl., 1 f.+15+354 p. 30 cm.

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Saturn and its ring, 1875–1889. By Asaph Hall, professor of mathematics, U. S. Navy. (Washington Observations, 1885, Appendix II.)

Washington, Government Printing Office [on cover 1889].

3 pl., 22 p. 29 cm.

The solar parallax and its related constants, including the figure and density of the Earth. By Wm. Harkness, professor of mathematics, U. S. Navy. (Washington Observations for 1885, Appendix III.)

Washington, Government Printing Office, 1891.

3+169 p. 29½ cm.

Contains bibliography.

Magnetic observations at the United States Naval Observatory, 1888 and 1889, by Ensign J. A. Hoogewerff, U. S. Navy. Captain F. V. McNair, U. S. Navy, superintendent. Publication approved by the Chief of Bureau of Equipment, Navy Department. (Washington Observations, 1886, Appendix I.)

Washington, Government Printing Office, 1890.

14 pl., 2 f.+100 p. 29½ cm.

A report upon some of the magnetic observatories of Europe, by C. C. Marsh, ensign, U. S. Navy. (Washington Observations, 1887, Appendix I.)

Washington, Government Printing Office, 1891.

6 pl., 1 f.+37 p. 31 cm.

Magnetic observations at the United States Naval Observatory, 1890, by J. A. Hoogewerff, ensign, U. S. Navy. Capt. F. V. McNair, U. S. Navy, superintendent. (Washington Observations, 1887, Appendix II.)

Washington, Government Printing Office, 1891.

4 pl., 1 f.+99 p. 30½ cm.

Meteorological observations and results at the United States Naval Observatory, 1883–1887. (Washington Observations, 1887, Appendix III.) [Prepared by Professor J. R. Eastman, U. S. N.]

Washington, Government Printing Office, 1891.

1 f.+261 p. 31 cm.

Observations of double stars made at the United States Naval Observatory. Part second, 1880–1891. By Asaph Hall, professor of mathematics, U. S. Navy. Capt. F. V. McNair, U. S. Navy, superintendent. (Washington Observations, 1888, Appendix I.)

Washington, Government Printing Office, 1892.

203 p. 31 cm.

Part I was published as Washington Observations for 1876, Appendix VI.

Magnetic observations at the United States Naval Observatory, 1891. By J. A. Hoogewerff, ensign, U. S. Navy. Capt. F. V. McNair, U. S. Navy, superintendent. (Washington Observations, 1888, Appendix II.)

Washington, Government Printing Office, 1892.

6 pl., 100 p. 31 cm.

Magnetic observations made at the United States Naval Observatory during the year 1892. By Stimson J. Brown, professor of mathematics, U. S. Navy. Capt. F. V. McNair, U. S. Navy, superintendent. (Washington Observations, 1889, Appendix I.)

Washington, Government Printing Office, 1893.

73 p. 29½ cm.

A catalogue of 16,748 southern stars deduced by the United States Naval Observatory from the zone observations made at Santiago de Chile by the U. S. Astronomical Expedition to the Southern Hemisphere during the years 1849-'50-'51-'52. Lieut. J. M. Gilliss, LL. D., superintendent: Lieut. Archibald MacRae, Master S. Ledyard Phelps, Captain's Clerk E. R. Smith; assistants. (Washington Observations for 1890, Appendix I.)

Washington, Government Printing Office, 1895.

1 pl., 67+420 p. 30 cm.

Embraces the results of all the observations which were to have been contained in the U. S. Naval Astronomical Expedition to the Southern Hemisphere, Vol. V.

The second Washington catalogue of stars, together with the annual results upon which it is based. The whole derived from observations made at the U. S. Naval Observatory, with the 8.5-inch transit circle, during the years 1866 to 1891, and reduced to the epoch 1875.0. Prepared under the direction of John R. Eastman, professor of mathematics, U. S. N. (Washington Observations for 1892, Appendix I.)

Washington, Government Printing Office, 1898.

63+287 p. 30 cm.

Magnetic observations at the United States Naval Observatory, 1894, by C. C. Marsh, lieut. U. S. Navy. Capt. F. V. McNair, U. S. Navy, superintendent. (Washington Observations, 1894, Appendix I.)

Washington, Government Printing Office, 1895.

13 pl., 113 p. 29½ cm.

The other observations made during the year 1894 were not published in this series, but are to be found in the various volumes of the Publications . . . Second series.

APPENDICES TO THE PUBLICATIONS, SECOND SERIES.

Total solar eclipses of May 28, 1900, and May 17, 1901. [Half-title. The title-page reads:] Publications of the United States Naval Observatory. Rear-Admiral Colby M. Chester, U. S. N., superintendent. Second series. Volume IV, Appendix I.

Washington, Government Printing Office, 1905.

78 fig. on 58 pl., 1 f.+307 p. 30 cm.

Two diagrams in text.

Reduction tables for transit circle observations, compiled under the direction of W. S. Eichelberger, professor of mathematics, U. S. N., head of division of meridian instruments. [Half-title. The title-page reads:] Publications of the United States Naval Observatory. Rear-Admiral Colby M. Chester, U. S. N., superintendent. Second series. Volume IV, Appendix II.

Washington, Government Printing Office, 1904.

1 f.+54 p. 30 cm.

Tables I-VIII, XV, XVI, and XVIII-XXII were devised and constructed by Assistant Astronomer H. L. Rice, who also transformed Tables XXVI-XXXIV. based upon the Pulkowa Refraction Tables, into the form here used.

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Reduction tables for equatorial observations by C. W. Frederick, assistant on equatorial. [Half-title. The title-page reads:] Publications of the United States Naval Observatory. Rear-Admiral Colby M. Chester, U. S. N., superintendent. Second series. Volume IV, Appendix III.
Washington, Government Printing Office, 1905.
1 f.+101 p. 30 cm.

The present status of the use of standard time, by Edward Everett Hayden, lieut.-commander, U. S. N., head of the department of chronometers and time service. [Half-title. The title-page reads:] Publications of the United States Naval Observatory. Rear-Admiral Colby M. Chester, U. S. N., superintendent. Second series. Volume IV, Appendix IV.
Washington, Government Printing Office, 1905.
1 f.+28 p. 29½ cm.
A separate page of errata has been issued since the first copies were distributed.

METEOROLOGICAL OBSERVATIONS.

***Discussion** of the meteorological phenomena observed . . . from June 30, 1842, to January 1, 1867. See Washington Observations, 1866, Appendix I.

***Meteorological** Observations at the United States Naval Observatory made during the year 1872. (Washington Observations for 1872.)
Washington, Government Printing Office, 1874.
64 p. 30 cm.

Meteorological Observations at the United States Naval Observatory made during the year 1873. (Washington Observations for 1873.)
Washington, Government Printing Office, 1874.
58 p.+2 f. 30 cm.

Meteorological Observations made at the United States Naval Observatory during the year 1874. (Washington Observations for 1874.)
Washington, Government Printing Office, 1875.
67 p. 29½ cm.

***Meteorological** Observations made at the United States Naval Observatory during the year 1875. (Washington Observations for 1875.)
Washington, Government Printing Office, 1877.
60 p.+2 f. 29½ cm.

Meteorological Observations made at the United States Naval Observatory during the year 1876. (Washington Observations for 1876.)
Washington, Government Printing Office, 1879.
63 p. 29½ cm.

Meteorological Observations made at the United States Naval Observatory during the year 1877. (Washington Observations, 1877.)
Washington, Government Printing Office, 1881.
21 p. 29½ cm.

Meteorological Observations made at the United States Naval Observatory during the year 1878. (Washington Observations, 1878.)
Washington, Government Printing Office, 1882.
18 p. 29½ cm.

Meteorological Observations made at the United States Naval Observatory during the year 1880. (Washington Observations for 1880.)
Washington, Government Printing Office, 1884.
18 p. 29½ cm.

Results of Meteorological Observations made at the United States Naval Observatory during the year 1881. (Washington Observations for 1881.)
Washington, Government Printing Office, 1885.
21 p. 29½ cm.

Results of Meteorological Observations made at the United States Naval Observatory during the year 1882. (Washington Observations for 1882.)
Washington, Government Printing Office, 1885.
21 p. 29½ cm.

Results of Meteorological Observations made at the United States Naval Observatory during the year 1883.
Washington, Government Printing Office, 1887.
21 p. 30 cm.
Not in the Washington Observations.

Meteorological Observations and Results . . . 1883–1887. See Washington Observations, 1887, Appendix III.

Meteorological Observations and Results at the United States Naval Observatory, 1888. (Washington Observations, 1888, pp. D 1–60.)
Washington, Government Printing Office, 1892.
60 p. 31 cm.

Meteorological Observations and Results; United States Naval Observatory, 1889. (Washington Observations, 1889.)
Washington, Government Printing Office, 1893.
57 p. 29½ cm.

Meteorological Observations and Results obtained at the United States Naval Observatory for the year 1890. (From the Washington Observations for 1890.)
Washington, Government Printing Office, 1894.
1 f.+57 p. 29½ cm.

Meteorological Observations and Results; United States Naval Observatory, 1891. (From the Washington Observations for 1891.)
Washington, Government Printing Office, 1902.
57 p. 29½ cm.

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Meteorological Observations and Results; United States Naval Observatory, 1892. (From the Washington Observations for 1892.)

Washington, Government Printing Office, 1902.

63 p. 29½ cm.

These and the observations for the preceding year, were issued in one cover; the cover title reading:

Meteorological Observations and Results; United States Naval Observatory, 1891–1892. (From the Washington Observations for 1891 and 1892.)

Washington, Government Printing Office, 1902.

Meteorological Observations and Results, 1893–1902. See Publications . . . Second series, Volume V.

REPORTS OF THE SUPERINTENDENT.

Report of the Superintendent of the United States Naval Observatory for the year 1878.

Washington, Government Printing Office, 1879.

13 p. 23 cm.

From Report of the Secretary of the Navy for 1878, p. 151–162; also in Washington Observations for 1878, p. V–XVI.

*Report of the Superintendent of the United States Naval Observatory for the year ending June 30, 1884.

Washington, Government Printing Office, 1884.

12 p. 23 cm.

From Report of the Secretary of the Navy for 1884, Vol. 1, p. 151–160; also in Washington Observations for 1884, p. V–XIV.

Report of the Superintendent of the United States Naval Observatory for the year ending June 30, 1885.

Washington, Government Printing Office, 1885.

14 p. 23 cm.

From Report of the Secretary of the Navy for 1885, Vol. 1, p. 104–115; also in Washington Observations for 1885, p. V–XVIII.

Report of the Superintendent of the United States Naval Observatory for the year ending June 30, 1886.

Washington, Government Printing Office, 1886.

20 p. 23 cm.

From Report of the Secretary of the Navy for 1886, p. 226–243; also in Washington Observations for 1886, p. V–XXIV.

Report of the Superintendent of the United States Naval Observatory for the year ending June 30, 1887.

Washington, Government Printing Office, 1887.

17 p. 23 cm.

From Report of the Secretary of the Navy for 1887, p. 211–225; also in Washington Observations for 1887, p. V–XXI.

Report of the Superintendent of the United States Naval Observatory for the year ending June 30, 1888.

Washington, Government Printing Office, 1888.

24 p. 23 cm.

From Report of the Secretary of the Navy for 1888, p. 159–180; also in Washington Observations, 1888, p. A. 3–A. 29.

Report of the Superintendent of the U. S. Naval Observatory for the year ending June 30, 1889, (Report of the Secretary of the Navy, 1889, Vol. 1, pp. 414–425.)

Washington, Government Printing Office, 1889.

[15] p. 23 cm.

Also in Washington Observations for 1889, p. V–XIX.

Report of the Superintendent of the U. S. Naval Observatory for the year ending 1890, June 30. (Report of the Secretary of the Navy, 1890, pp. 92–103.)

Washington, Government Printing Office, 1890.

[15] p. 23 cm.

Also in Washington Observations for 1890, p. V–XVIII.

Report of the Superintendent of the U. S. Naval Observatory for the year ending 1891 June 30. (Report of the Secretary of the Navy, 1891, pp. 122–131.)

Washington, Government Printing Office, 1891.

[13] p. 23 cm.

Also in Washington Observations for 1891, p. V–XVIII.

Report of the Superintendent of the U. S. Naval Observatory for the year ending 1892 June 30. (Report of the Secretary of the Navy, 1892, pp. 133–140.)

Washington, Government Printing Office, 1892.

[10] p. 23 cm.

Also in Washington Observations for 1892, p. V–XII.

Report of the Superintendent of the U. S. Naval Observatory for the year ending June 30, 1893. (Report of the Secretary of the Navy, 1893 [p. 153–164]).

Washington, Government Printing Office, 1893.

13 p. 23 cm.

Report of the Superintendent of the U. S. Naval Observatory for the year ending June 30, 1894. (Report of the Secretary of the Navy, 1894, pp. 164–169.)

Washington, Government Printing Office, 1895.

[7] p. 23 cm.

Report of the Superintendent for 1895.

This and the Report for 1896 were not published seperately. They may be found in the Reports of the Secretary of the Navy, 1895, p. 110–122; 1896, p. 200–217.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1897.

Washington, Government Printing Office, 1897.

16 p. 23 cm.

From Report of the Secretary of the Navy for 1897, p. 201–215.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1898.

Washington, Government Printing Office, 1898.

19 p. 23 cm.

From Report of the Secretary of the Navy for 1898, Vol. I, p. 273–289.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1899.

Washington, Government Printing Office, 1899.

27 p. 23 cm.

From Report of the Secretary of the Navy for 1899, p. 328–352.

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Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1900.

Washington, Government Printing Office, 1900.

34 p. 23 cm.

From Report of the Secretary of the Navy for 1900, p. 325–356.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1901.

Washington, Government Printing Office, 1901.

35 p. 23 cm.

From Report of the Secretary of the Navy for 1901, p. 387–419.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1902.

Washington, Government Printing Office, 1902.

1 diagr. + 1 tab. + 2 pl., 38 p. 23 cm.

From Report of the Bureau of Equipment for 1902, p. 89–124.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1903.

Washington, Government Printing Office, 1903.

1 tab. + 2 pl., 32 p. 23 cm.

From Report of the Secretary of the Navy for 1903, p. 424–453.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1904.

Washington, Government Printing Office, 1904.

1 tab. + 3 pl., 53 p. 23 cm.

From Report of the Secretary of the Navy for 1904, p. 389–439.

Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1905.

Washington, Government Printing Office, 1905.

3 tab., 17 p. 23 cm.

From Report of the Secretary of the Navy for 1905, p. 349–363.

Synopsis of the Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1906.

Washington, Government Printing Office, 1906.

3 tab., 10 p. 23 cm.

Synopsis of the Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1907. (Navy Department, United States Naval Observatory.)

Washington, Government Printing Office, 1908.

3 tab., 10 p. 23 cm.

*Synopsis of the Report of the Superintendent of the United States Naval Observatory for the fiscal year ending June 30, 1908. (Navy Department, United States Naval Observatory.)

Washington, Government Printing Office, 1908.

3 tab., 1 f. + 16 p. 23 cm.

SAILING DIRECTIONS, &c.

*Abstract log, for the use of American navigators, prepared under the direction of Commodore Lewis Warrington, Chief of the Bureau of Ordnance and Hydrography, by authority of Hon. John Y. Mason, Secretary of the Navy. By Lieut. M. F. Maury, U. S. N., Superintendent National Observatory.

Washington, C. Alexander, printer, 1848.

10 p. + 12 f. of blank forms. 25½ cm.

*Abstract log, for the use of American navigators, prepared under the direction of Commodore Lewis Warrington, Chief of the Bureau of Ordnance and Hydrography, by authority of the Hon. John Y. Mason, Secretary of the Navy. Second edition. By Lieut. M. F. Maury, U. S. N., Superintendent National Observatory.

Washington, C. Alexander, printer, 1848.

21 p. 28 cm.

A reprint was issued bearing the date 1849.

*Notice to mariners: by Lieut. M. F. Maury . . .

This is the only title in the present List that has not been taken directly from the publication entered. A copy not being available for inspection, no attempt has been made to give a fuller description. The manuscript was transmitted to the Navy Department on December 14, 1849, and a receipt dated January 17, 1850, for a copy of the publication, is now on file at the Observatory. In the Catalogue of the library of the Franklin Institute, 1870, it is said to consist of 18 pages, 4°.

*Notice to mariners: by Lieut. M. F. Maury, U. S. N., National Observatory, Washington. Approved by the Hon. William Ballard Preston, Secretary of the Navy: and published by authority of Commodore Lewis Warrington, Chief of the Bureau of Ordnance and Hydrography. Second edition.

Washington, C. Alexander, printer, 1850.

51 p. 27½ cm.

*On the establishment of an universal system of meteorological observations, by sea and land. [Signed by M. F. Maury.]

Washington, C. Alexander, printer, F street near Navy Department, 1851.

Cover-title + 30 p. 19½ cm.

*Lieut. Maury's Investigations of the winds and currents of the sea. From the Appendix to the Washington Astronomical Observations for 1846 [p. 41–164]. Published by authority of Hon. William A. Graham, Secretary of the Navy; and of Commodore Lewis Warrington, Chief of the Bureau of Ordnance and Hydrography. National Observatory, Feb. 1851.

Washington, C. Alexander, printer, 1851.

126 p. 28 cm.

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*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Commodore Lewis Warrington, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. William A. Graham, Secretary of the Navy. By Lieut. M. F. Maury, U. S. N., Superintendent of the National Observatory. [Third edition.]

Washington, C. Alexander, printer, F street near Navy Department, 1851.

12 pl., 315 p.+1 f. 28½ cm.

*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Commodore Charles Morris, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. William A. Graham, Secretary of the Navy. By Lieut. M. F. Maury, U. S. N., Superintendent of the National Observatory. Fourth edition.

Washington, C. Alexander, printer, F street near Navy Department, 1852.

19 pl., 413 p.+1 f. 29½ cm.

*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Commodore Charles Morris, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. J. P. Kennedy, Secretary of the Navy. By M. F. Maury, LL. D., lieut. U. S. N., Superintendent of the National Observatory. Fifth edition, enlarged and improved. [With supplement.]

Washington, C. Alexander, printer, F street near Navy Department, 1853.

23 pl., 492+30 p. 28½ cm.

*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Commodore Charles Morris, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. J. C. Dobbin, Secretary of the Navy. By M. F. Maury, LL. D., U. S. N., Superintendent of the National Observatory. Sixth edition, enlarged and improved.

Philadelphia, E. C. and J. Biddle, No. 6 So. Fifth street, 1854.

17 pl., 772 p. 28½ cm.

*Abstract log for the merchant service. [By Lieut. M. F. Maury.]

[*Philadelphia, E. C. and J. Biddle, 1854.*]

1 pl., 11 p. of text+102 p. of blank forms on 52 f. 35 cm.

Caption title.

*Abstract log for men-of-war. [By Lieut. M. F. Maury.]

[*Philadelphia, E. C. and J. Biddle, 1855.*]

1 pl., 8 p. of text+202 p. of blank forms on 102 f. 35 cm.

Caption title.

In addition to the above collation, there was inserted in each copy, a printed order of one page, commencing as follows: This abstract log must be faithfully kept . . .

*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Commodore Charles Morris, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. J. C. Dobbin, Secretary of the Navy. By M. F. Maury, LL. D., lieut. U. S. N., Superintendent of the U. S. N. Observatory and Hydrographical Office, Washington. Seventh edition, enlarged and improved.

Philadelphia, E. C. and J. Biddle, No. 8 Minor street, 1855.

23 pl., 36+869 last verso blank +[1]+34 p. 28½ cm.

The last 35 p. are lithographed and bear the caption title:

Appendix. Abstract log of the ship *Garrick*, Captain R. W. Foster, from New York to Liverpool and from Liverpool to New York, 1854.

*Maury's Wind and Current Charts. Gales in the Atlantic.

Observatory, Washington, May, 1857.

24 colored pl.,+[3] lith. p. which contain the title-page and the explanation which begins on verso of title. 29 cm.

*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Captain D. N. Ingraham, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. Isaac Toucey, Secretary of the Navy. By M. F. Maury, LL. D., U. S. N., Superintendent of the U. S. Observatory and Hydrographical Office, Washington. Volume I. Eighth edition, enlarged and improved.

Washington, William A. Harris, printer, 1858.

63 pl., 36+383 p. 29½ cm.

*Explanations and sailing directions to accompany the Wind and Current Charts, approved by Captain D. N. Ingraham, Chief of the Bureau of Ordnance and Hydrography; and published by authority of Hon. Isaac Toucey, Secretary of the Navy. By M. F. Maury, LL. D., U. S. N., Superintendent of the U. S. Observatory and Hydrographical Office, Washington. Volume II. Eighth edition, enlarged and improved.

Washington, Cornelius Wendell, printer, 1859.

7 pl., 7+874 p. 29½ cm.

*Sailing directions for Sandy Hook.

No place, no date.

1 pl., 8 p. 29½ cm.

Caption title.

Also in Explanations and sailing directions, Vol. II, p. 64–70.—Eighth edition, 1859.

*The winds at sea; their mean direction and annual average duration from each of the four quarters. [Caption title. Signed: M. F. Maury. Cover-title:] Nautical Monographs, No. 1.

Observatory, Washington, October, 1859.

4 pl., cover-title+8 p. 29½ cm.

*The barometer at sea. (Maury's Monographs, No. 2.) [Caption title. Cover-title reads:] Maury's Nautical Monographs, No. 2. The barometer at sea.

Observatory, Washington, March, 1861.

1 pl., cover-title+20 p. 29½ cm.

*The south-east trade-winds of the Atlantic. (Nautical Monograph, No. 3.) [Caption title. On cover:] Maury's Nautical Monographs, No. 3. The barometer at sea.

Observatory, Washington, May, 1861.

Cover-title+20 p. 29½ cm.

The words "The barometer at sea" were inadvertently printed on the cover.

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WIND AND CURRENT CHARTS.

*Wind and Current Chart of the North Atlantic, by M. F. Maury, A. M., lieut. U. S. Navy, Superintdt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography; Commodore Lewis Warrington, chief of bureau. Drawn by Lt. W. B. Whiting, U. S. N. Sheet *No. 1.* [*Series A*, Track charts.] [1847.]

1 sheet, 89 x 61 cm.

No marginal number.
Seal above title.
No copyright. No date.
Latitude 0° to 40° N., longitude 100° W. to 70° W.

*Wind and Current Chart of the North Atlantic, by M. F. Maury, A. M., lieut. U. S. Navy, Superintdt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography; Commodore Lewis Warrington, chief of bureau. Drawn by Lt. W. B. Whiting, U. S. N. Sheet *No. 1.* [*Series A*, Track charts.] 1848.

1 sheet, 88½ x 60½ cm.

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Seal above title.
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Latitude 0° to 40° N., longitude 100° W. to 70° W.

*Wind and Current Chart of the North Atlantic, by M. F. Maury, A. M., lieut. U. S. Navy, Superintdt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography; Commodore Lewis Warrington, chief of bureau. Drawn by Lt. W. B. Whiting, U. S. N. 1848. 3d edition, 1850. *No. 1, Series A* [Track charts].

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Copyright, 1850.
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*Wind and Current Chart of the North Atlantic, by M. F. Maury, LL. D., lieut. U. S. Navy, Superintdt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography; Commodore Lewis Warrington, chief of bureau. Drawn by Lt. W. B. Whiting, U. S. N. 1852. 3d edition, 1852. *No. 1, Series A* [Track charts].

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*[Maury's Wind & Current Chart. North Atlantic. *No. 2, Series A*, Track charts.]

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*Maury's Wind & Current Chart, Sheet *No. 2.* [North Atlantic. *Series A*, Track charts.]

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*Maury's Wind & Current Chart [North Atlantic]. 3d edition, 1852. *No. 2, Series A* [Track charts].

1 colored sheet, 89 x 61 cm.

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Copyright, 1850.
Latitude 0° to 40° N., longitude 70° W. to 40° W.

*Maury's Wind & Current Chart. North Atlantic, *No. 3, Series A* [Track charts].

1 sheet, 87½ x 61½ cm.

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Latitude 0° to 40° N., longitude 40° W. to 10° W.

*Maury's Wind & Current Chart. Sheet *No. 3* [North Atlantic. *Series A*, Track charts].

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Latitude 0° to 40° N., longitude 40° W. to 10° W.

*Maury's Wind & Current Chart [North Atlantic]. 3d edition, 1852. *No. 3, Series A* [Track charts].

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*Maury's Wind & Current Chart [North Atlantic]. 3d edition, 1849. *No. 5, Series A* [Track charts].

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*Maury's Wind & Current Chart [North Atlantic]. 3d edition, 1849. *No. 6, Series A* [Track charts].

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*Maury's Wind & Current Chart [North Atlantic]. Sheet *No. 8* [*Series A*, Track charts].

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*Maury's Wind & Current Chart [North Atlantic]. 3d edition, 1849. *No. 8, Series A* [Track charts].

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*Wind and Current Charts (*Series B*). Trade wind chart of the Atlantic Ocean, by M. F. Maury, U. S. N., Superintendent National Observatory. Compiled by Lt. E. J. De Haven, U. S. N., from materials in the Bureau of Ordnance and Hydrography; Com^dre L. Warrington, chief of bureau.

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Explanation dated January, 1851, and signed by M. F. Maury.
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*Wind and Current Charts (*Series B*). Trade wind chart of the Atlantic Ocean, by M. F. Maury, LL. D., lieut. U. S. N., Superintendent National Observatory. Compiled by Lt. E. J. De Haven, U. S. N., from materials in the Bureau of Ordnance and Hydrography; Commodore Chs. Morris, chief of bureau.

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No copyright.
Latitude 38° N. to 38° S., longitude 80° W. to 20° E.

*Pilot Chart of the North Atlantic, by M. F. Maury, A. M., lieut. U. S. Navy. Compiled at the National Observatory, from materials in the Bureau of Ordnance and Hydrography; Commodore Lewis Warrington, chief of bureau. 1849. [*Series C.*] Sheet *No. 1.*

1 sheet, 89½ x 63 cm.

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Seal above title.
No copyright.
Latitude 0° to 40° N., longitude 100° W. to 50° W.

*Pilot Chart of the North Atlantic, by M. F. Maury, LL. D., lieut. U. S. Navy, Superint^dt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordinance and Hydrography; Commodore Charles Morris, chief of bureau. 1853. *Series C, No. 1.* 2nd edition; enlarged and improved with data co-ordinated by J. M. Brooke, passed mid^n, U. S. Navy.

1 sheet 88½ x 62 cm.

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Latitude 0° to 70° N., longitude 100° W. to 50° W.

*Pilot Chart of the North Atlantic, by M. F. Maury, LL. D., lieut. U. S. Navy, Superint^dt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography; Commodore Charles Morris, chief of bureau. 1853. *Series C, No. 1.* 2nd edition, enlarged and improved with data co-ordinated by J. M. Brooke, passed mid^n, U. S. Navy. New edition corrected 1857.

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Explanation signed: M. F Maury, National Observatory, Washington, April 1849.
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*Pilot Chart of the North Atlantic. M. F. Maury, LL. D., lieut. U. S. Navy, National Observatory, Washington, 1853. Sheet *No. 2, Series C.*

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*Pilot Chart of the North Atlantic. M. F. Maury, LL. D., lieut. U. S. Navy. National Observatory, Washington. 1853. Sheet *No. 2, Series C.* New edition corrected 1857.

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Explanation signed: M. F. Maury . . . National Observatory, Washington, May 1858.
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Latitude 0° to 70° N., longitude 50° W. to 0°.

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*Wind and Current Chart of the North Atlantic, by M. F. Maury, A. M., lieut. U. S. Navy, Superintdt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography; Commodore Lewis Warrington, chief of bureau. Drawn by Lt. Benj'n S. Gantt, U. S. N. 1850. Thermal sheet *No. 1, Series D.*

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No copyright.
Latitude 40° S. to 65° 30′ S., longitude 110° E. to 140° E.

*Wind and Current Charts. *Series B.* Monsoon and trade wind chart of the Indian Ocean, by M. F. Maury, LL. D., comr U. S. N., Superintendent of U. S. N. Observatory, Washington. Compiled by Lieuts. J. J. Guthrie, H. S. Newcomb, N. H. Van Zandt, Ed. C. Stout, T. T. Houston, and projected by Lt. R. L. May, from materials in the Bureau of Ordnance and Hydrography; Captain D. N. Ingraham, chief of bureau. 1859.

1 colored sheet, 44 x 90 cm.

Marginal No. 125.
No seal.
Explanation signed: M. F. Maury. Observatory, Washington, January 1860.
No copyright.
Latitude 18° N. to 18° S., longitude 40° E. to 110° E.

*Pilot Chart of the North Indian Ocean, by M. F. Maury, LL. D., lieut. U. S. Navy, Superindt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography by Lieuts W. B. Fitzgerald & Wm. C. West, U. S. N. Commodore Charles Morris, chief of bureau. 1855. *Series C, Nos. 1 & 2.*

On 1 sheet, 56 x 89½ cm.

Marginal Nos. 66 & 67.
Seal above title.
Note signed: M. F. Maury . . . National Observatory, Dec. 28th, 1855.
No copyright.
Latitude 0° to 45° N., longitude 35° E. to 105° E.

*Pilot Chart of the South Indian Ocean, by M. F. Maury, LL. D., lieut. U. S. Navy, Superindt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography, Commodore Charles Morris, chief of bureau. 1853. *Series C, No. 1.*

1 sheet, 88½ x 57½ cm.

Marginal No. 60.
Seal above title.
Note signed: M. F. Maury . . . National Observatory, October 1853.
No copyright.
Latitude 0° to 70° S., longitude 15° E. to 60° E.

*Pilot Chart of the South Indian Ocean, by Lieut. M. F. Maury, U. S. Navy. National Observatory, Washington. Sheet *2, Series C.*

1 sheet, 89½ x 56 cm.

Marginal No. 61.
Seal above title.
Note signed: M. F. Maury . . . National Observatory, October 1853.
No copyright.
Latitude 0° to 70° S., longitude 60° E. to 105° E.

*Pilot Chart of the South Indian Ocean, by M. F. Maury, LL. D., comdr U. S. Navy, Superindt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography, by Lieuts. J. J. Guthrie, W. C. West, & J. H. Carter, U. S. N. Captain D. N. Ingraham, chief of bureau. 1859. *Series C, No. 3.*

1 sheet, 89½ x 56½ cm.

Marginal No. 62.
Seal above title.
Note signed: M. F. Maury . . . National Observatory, September 1859.
On lower margin: Eng. by Oliver J. Stuart, N. Y.
No copyright.
Latitude 0° to 70° S., longitude 105° E. to 150° E.

*A chart showing the favorite resort of the sperm and right whale, by M. F. Maury, LL. D., lieut. U. S. Navy. Constructed from Maury's Whale chart of the world, by Robt H. Wyman, lieut. U. S. N., by authority of Commo. Charles Morris, U. S. N., Chief of Bureau of Ordnance and Hydrography. 1853 . . . Re-engraved 1859.

1 colored sheet, 59½ x 93 cm.

Marginal No. 78.
No seal.
On lower margin: Lith. of Endicott & Co., N. Y.
No copyright.
Latitude 88° N. to 68° S., longitude 30° W. to 30° W.

*Whale Chart of the World, by M. F. Maury, LL. D., lieut. U. S. Navy, Superindt of U. S. N. Observatory, Washington. Compiled from materials in the Bureau of Ordnance and Hydrography, Commodore Charles Morris, chief of bureau, by P. M. A. C. Jackson, U. S. N. 1852. *Series F, No. 1.*

1 sheet, 61½ x 88½ cm.

Marginal No. 79.
Seal above title.
No copyright.
Latitude 20° N. to 80° N., longitude 180° W. to 0°.

*Maury's Wind & Current Chart. Whale sheet *No. 2, Series F.*

1 sheet, 62 x 91 cm.

Marginal No. 80.
Seal above title.
No copyright. No date.
Latitude 20° N. to 80° N., longitude 0° to 180° E.

*Maury's Wind & Current Chart. Whale sheet *No. 3, Series F.*

1 sheet, 62 x 91 cm.

Marginal No. 81.
Seal above title.
No copyright. No date.
Latitude 20° N. to 70° S., longitude 180° W. to 0°.

*Maury's Wind & Current Chart. Whale sheet *No. 4, Series F.*

1 sheet, 62 x 91 cm.

Marginal No. 82.
Seal above title.
No copyright. No date.
Latitude 20° N. to 70° S., longitude 0° to 180° E.

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*A chart illustrative of the cruise of the American Arctic Expedition in search of Sir John Franklin, in the years 1850 & '51. Fitted out by Henry Grinnell Esq. of New York, commanded by E. J. De Haven, lieut. U. S. Navy. Brig *Advance*, Lieut. De Haven; Sch'r *Rescue*, P. Mid. S. P. Griffin, U. S. N. Compiled by P. M. Geo. P. Welsh, U. S. N., under the direction of M. F. Maury, A. M., lieut. U. S. Navy, from materials in the Bureau of Ordnance and Hydrography, Commodore Lewis Warrington, chief of bureau. [1853?]

1 colored sheet, 60 x 63½ cm.

Marginal No. 116.
Seal above title.
Note signed: M. F. Maury.
Explanation with the address of the sellers, New York, Disturnell & Schroeter, pasted on.
Latitude 58° N. to 80° N., longitude 100° W. to 40° W.

Key to Marginal Numbers of Wind and Current Charts.

Marg. No.	Title.	Sheet No.	Marg. No.	Title.	Sheet No.
1	N. Atl. Track.	1	51	N. Pac. Track.	3
2	" " "	2	52	" " "	4
3	" " "	3	53	" " "	5
4	" " "	4	54	" " "	6
5	" " "	5	55	" " "	7
6	" " "	6	56	" " "	8
7	" " "	7	57	" " "	9
8	" " "	8	58	" " "	10
9	N. Atl. Pilot.	1	59	" " "	11
10	" " "	2	60	S. Ind. Oc. Pilot.	1
11	Brazil Pilot.		60[b]	S. Pac. Pilot.	1
12	S. Atl. Pilot.	1	61	S. Ind. Oc. Pilot.	2
13	" " "	2	61[b]	S. Pac. Pilot.	2
14	N. Atl. Thermal.	1	62	S. Ind. Oc. Pilot.	3
15	" " "	2	63	S. Pac. Pilot.	[4]
16	" " "	3	64	" " "	5
17	" " "	4	65	" " "	6
18	" " "	5	66 & 67[c]	N. Ind. Pilot.	1 & 2
19	" " "	6	66	N. Pac. Pilot.	1
20	" " "	7	67	" " "	2
21	" " "	8	68	" " "	3
22	S. Atl. Track.	1	69[a]	" " "	4
23	" " "	2	70	" " "	5
24	" " "	3	71	" " "	6
25	" " "	4	72	S. Atl. Thermal.	1
26[a]	" " "	5	73	" " "	2
27[a]	" " "	6	74	" " "	3
28[a]	Ind. Oc. Track.	1	75	" " "	4
29[a]	" " "	2	76[a]	" " "	5
30[a]	" " "	3	77[a]	" " "	6
31	" " "	4	78	Resort of the Sperm and Right Whale.	
32	" " "	5			
33	" " "	6	79	Whale Chart of World.	1
34	" " "	7	80	" " " "	2
35	" " "	8	81	" " " "	3
36	" " "	9	82	" " " "	4
37	" " "	10	83–115[d]		
38	" " "	11	116	American Search for Sir John Franklin.	
39[a]	S. Pac. Track.	1			
40[a]	" " "	2	117	Cape Horn Pilot.	1
41[a]	" " "	3	118	" " "	2
42[a]	" " "	4	119	N. Atl. Storm and Rain.	
43	" " "	5	120	S. Atl. Storm and Rain.	
44[a]	" " "	6	121–124[e]		
45[a]	" " "	7	125	Ind. Oc. Monsoon & Trade Wind.	
46	" " "	8			
47	" " "	9	126[f]	Atlantic Trade Wind.	
48	" " "	10	127[f]	N. Pac. Trade Wind.	
49[a]	N. Pac. Track.	1	128[f]	S. Pac. Storm and Rain.	
50	" " "	2	129	N. Pac. Storm and Rain.	

[a] Not in the list and probably never published.

[b] Practically covers the same ground as the preceding chart in the Key.

[c] On one sheet, superseding the two sheets following in the Key.

[d] Marginal Nos. 83–115 were probably reserved for the thermal sheets of the North Pacific, Indian, and South Pacific oceans, eleven sheets of each, which are known to have been planned.

[e] Marginal Nos. 121–124 seem to have been set aside for the Physical Map of the Ocean, in four sheets.

[f] The probabilities are that marginal Nos. 126–128 were reserved for the charts assigned to them in the Key; but there is no certainty as to whether the Trade Wind Chart of the Atlantic should be 126 or 127, or any of the above numbers, as it was published as late as 1859 without a marginal number.

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SPECIFICATIONS RELATING TO THE NEW NAVAL OBSERVATORY.

*Circular relating to the construction of a new Naval Observatory, including advertisement of April 10, 1888.

[*Washington*] *Navy Department, 1888.*

44 p. 20 cm.

Again circulated with manuscript amendments in December, 1891.

*Plan of the boundaries and grounds of the U. S. Naval Observatory, Washington, D. C. 1891. Surveyed by W. Kesley Schoepf, civil and topographical engineer, Washington, D. C. Drawn by Edward H. Berry.

Bell Litho. Co., Wash'n, D. C.

1 lithographed sheet, 59 x 96½ cm.

Scale about 120 feet to the inch.

*Specifications for material for U. S. Naval Observatory. November 24, 1891.

Washington, D. C., Government Printing Office, 1891.

Cover-title+16 p. 19 cm.

*Specifications for engine pumps, pump house, etc, to be furnished for the United States Naval Observatory, Georgetown Heights, District of Columbia, from plans prepared by Léon E. Dessez, architect, Corcoran building, Washington, D. C.

Washington, Government Printing Office, 1891.

25 p. 18 cm.

*Specifications of materials to be furnished and labor to be performed in the erection and completion of a brick fire proof extension of the boiler house and retaining wall for the installation of the electric plant at the United States Naval Observatory, Georgetown Heights, District of Columbia.

Washington, Government Printing Office, 1891.

14 p. 18 cm.

Reissued with manuscript alterations and amendments, Aug. 26, 1891.

*Specifications of materials to be furnished and labor to be performed in the construction and completion of conduits from the west end of the main building to the great equatorial building, thence to the clock room, at the New Naval Observatory, Georgetown Heights, District of Columbia.

[*Washington, 1891?*]

6 p. 20½ cm.

Caption title.

*Specifications of materials to be furnished and labor to be performed in the construction and completion of one first-class passenger elevator and one small freight elevator at the New Naval Observatory, Georgetown Heights, District of Columbia.

[*Washington, 1891?*]

10 p. 20½ cm.

Caption title.

*Specifications of materials to be furnished and labor to be performed in the construction and completion of bookcases, railing, shelving, standards, etc. Library fittings at the New Naval Observatory, Georgetown Heights, District of Columbia.

[*Washington, 1891?*]

10 p. 20½ cm.

Caption title.

*Specifications of material and labor for a brick residence for the Sup't of U. S. Naval Observatory, Georgetown, D. C., from plans and specifications prepared by Léon Dessez, architect.

Washington, Government Printing Office, 1891.

24 p. 18 cm.

Again circulated with manuscript alterations and amendments, Aug. 26, 1891.

*Specifications for repairing and remounting instruments, etc., at U. S. Naval Observatory. (Navy Department, Bureau of Equipment.)

Washington, Government Printing Office, 1891.

Cover-title+24 p. 19 cm.

*Specifications for carpets, linoleum, and office furniture for the United States Naval Observatory, at Georgetown Heights, District of Columbia.

[*Washington, 1892?*]

Cover-title+6 p. 19 cm.

*[Circular inviting] Proposals for completion of the New Naval Observatory.

Navy Department, Washington, D. C., January 7, 1892.

[1] *p. 19½ cm.*

Caption title.
Signed: B. F. Tracy, Secretary of the Navy.

*Specifications for the installation of an electric lighting plant at the New Naval Observatory, Georgetown Heights, Washington, D. C.

Washington, Government Printing Office, 1892.

13 p. 19 cm.

*Specifications for construction of a meridian circle and its accessories at U. S. Naval Observatory. (Navy Department, Bureau of Equipment.)

Washington, Navy Branch, G. P. O., 1893.

Cover-title+15 p. 19 cm.

*Specifications of labor and materials for two brick buildings to be built on the grounds of the U. S. Naval Observatory, Georgetown, D. C., from plans and specifications prepared by Wm. J. Marsh, architect.

Washington, Government Printing Office, Navy Branch, 1895.

31 p. 19½ cm.

*Proposal. [To furnish all the materials and labor necessary for the construction of two brick dwellings in the grounds of the Naval Observatory, Georgetown Heights, D. C.]

[*Washington, 1895.*]

[3] *p. of blank forms. 35 cm.*

*Proposal for the purchase of Naval Observatory lands.

[*Washington, 1895.*]

1 pl., 3 p. 35 cm.

Caption title.

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*Specifications of labor and materials for two brick dwellings to be built on the grounds of the U. S. Naval Observatory, Georgetown, D. C., from plans and specifications prepared by Wm. J. Marsh, architect.
Washington, Government Printing Office, 1896.
26 p. 19½ cm.

*Status of lands lying within the Observatory Circle, October 1, 1901.
1 lithographed sheet, 40½ x 45½ cm.
Scale about 275 feet to the inch. Shows the acreage and cost of lands purchased and to be purchased.

MATHEMATICAL AND ASTRONOMICAL TABLES.

*I. Logarithms of numbers.—II. Logarithmic sines, etc., for every tenth of degree.—III. Logarithmic sines, etc., for every degree.—IV. Antilogarithms.—V. Logarithm of the sum.—VI. Logarithm of the difference. [3 places.]
[Washington, 1874.]
2 f., versos blank. 25 x 31 cm.

*Logarithms of numbers.—Antilogarithms. [1–100, to 4 places.]
2 f., versos blank. 27½ x 30 cm.

*Refraction and other tables, prepared especially for the reduction of observations at the National Observatory, Washington. Lt. M. F. Maury, United States Navy, superintendent. [Prepared by Prof. J. H. C. Coffin.]
Washington, printed by J. & G. S. Gideon, 1846.
9+24 p. 29½ cm.
Also in Washington Observations, 1845, Appendix, p. 58–86.

*Table of zenith distances to 80°, for the latitude of the United States Naval Observatory, Washington.—Tables of differential refraction, for the latitude of the United States Naval Observatory, from +30° to −30°, of declination, and to 80° of zenith distance, d^1—d being constant and equal to 600″.—Tables of parallax for the latitude of the U. S. Naval Observatory, and a horizontal parallax of 10 seconds. [By James Ferguson and Asaph Hall.]
[Washington, Government Printing Office, 1862.]
34 p. 30 cm.
Also in Washington Observations, 1861, p. 349–358, 359–374, 433–438.

*Constants relating to the instruments in use at the U. S. Naval Observatory. Determined by Prof. Wm. Harkness, U. S. N.
[Washington, Government Printing Office, 1867.]
[1] p. 28 x 23 cm.
Also in Washington Observations, 1865, p. XXXVI.

Auxiliary table for computing refractions. [By Prof. E. S. Holden.]
[Washington, Government Printing Office, 1881.]
1 f.+3 p. 30 cm.
Also in Washington Observations, 1877, Appendix I, p. 42–44.
For differential refractions only.

*Collimation, level, and azimuth factors for the United States Naval Observatory. Latitude=+38° 53′ 38″.8. [By Assistant Astronomer Henry M. Paul.]
[Washington, about 1882?]
1 f.+8 p. 30 cm.

Refraction tables. [Prepared by Prof. J. R. Eastman, U. S. N.]
[Washington] U. S. Naval Observatory, 1887.
1 f.+37 p. 30 cm.

*Table A.—Reduction to meridian.
[1] p. 30½ x 42½ cm.

*Table B.—Transit circle. Micrometer equivalents.
[1] p. 27½ x 36 cm.

*Table C.—Transit circle. Reductions to mean thread.
2 f., versos blank. 34 x 29 cm.

*Table D.—Close circumpolar stars. Reductions to mean thread.
[1] p. 27½ x 36½ cm.

*Table E.—Interpolation table for the independent star numbers, *f*, *G*, *H*, and logs. *g*, *h*, and *i*.
[1] p. 34½ x 26 cm.

Reduction tables for transit circle observations. See Publications, . . . Second Series, Volume IV, Appendix II.

Reduction tables for equatorial observations. See Publications, . . . Second Series, Volume IV, Appendix III.

SPECIAL REPORTS, OBSERVATIONS, CIRCULARS, &c.

*Report of the Secretary of the Navy, communicating a Report of the plan and construction of the Depot of Charts and Instruments, with a description of the instruments, &c. [By Lieut. J. M. Gilliss, U. S. N.]
[Washington, 1845.]
10 pl., 77 p. 23 cm.
28th Cong., 2d sess., Senate Docs., Vol. VII, No. 114. Gilliss' Report, dated Feb. 7, 1845; Secretary's letter of transmission, dated Feb. 17, 1845.

*Circular prepared by direction of the Hon. Wm. Ballard Preston, Secretary of the Navy, in relation to the Astronomical Expedition to Chile. By Lieut. M. F. Maury, U. S. N., Superintendent of the National Observatory.
Washington, C. Alexander, printer, 1849.
7 pl., 33 p. 26½ cm.
Contents:
To the friends of astronomical science [signed by] Lieut. M. F. Maury, U. S. Navy, p. [3]–5.

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Table I. Ephemeris of Venus and her stars of comparison, during the stationary periods of the planet in 1850 & 1852, by Lieut. J. M. Gilliss, U. S. N., p. [7]–19.
Table II. Ephemeris of Mars and its stars of comparison during the opposition of the planet in 1849 & 1852, by Lieut. J. M. Gilliss, U. S. N., p. [21]–33.

*Official report of the United States Expedition to explore the Dead Sea and the River Jordan, by Lieut. W. F. Lynch, U. S. N. Published at the National Observatory, Lieut. M. F. Maury, U. S. N., superintendent, by authority of the Hon. Wm. A. Graham, Secretary of the Navy.

Baltimore, printed by John Murphy & Co., No. 178 Market street, 1852.

17 pl., 235 p. 28 cm.

30th Cong., 2d sess., Senate Ex. Doc. No. 34.
The above "Report was printed, in part, by order of the United States Senate, in 1849, but the Geological portion was not finished until September, 1851."

*On the probable relation between magnetism and the circulation of the atmosphere. [By M. F. Maury.]

Caption title. The first page contains only the following: From the Appendix to the Washington Astronomical Observations for 1846 [p. 74–88]
Washington, C. Alexander, printer, 1851.
17 p. 28½ cm.
Also in Explanations and sailing directions, 4th edition, p. 90–104.

*Zones of stars observed at the National Observatory, Washington. Approved by Capt. G. A. Magruder, Chief of the Bureau of Ordnance and Hydrography; and published under authority of the Hon. Isaac Toucey, Secretary of the Navy, by Commander M. F. Maury, LL. D., superintendent. Vol. I., Part I., containing the zones observed with the meridian circle in 1846 [by Prof. J. S. Hubbard and Lieut. L. Maynard; edited by Assistant Astronomer James Ferguson].

Washington, George W. Bowman, printer, 1860.

16+102 p.+1 f. 32 cm.

*Ephemeris of stars proper for observation with the planet Mars, near the opposition, 1862. Prepared at the U. S. Naval Observatory, March, 1862.

Washington, Government Printing Office, 1862.

1 pl., 8 p. 22½ cm.

Introduction signed by J. M. Gilliss.

*Time and fire-alarm signals by telegraph. To be used between the U. S. Naval Observatory and the Central Police Office, Washington, D. C. [Signed by:] C. H. Davis, rear-admiral, and supt. U. S. N. Observatory. Approved: Thornton A. Jenkins, chief of bureau.

[*Washington, 1865.*]

[1] p. 23+29 cm.

*November meteors of 1866 as observed at the U. S. Naval Observatory, Washington.

[*Washington, 1866?*]

1 pl., cover-title+7 p. 23 cm.

*Letter of the Secretary of the Navy [dated July 12, 1866] communicating, in compliance with a resolution of March 19th last, a report of Rear-Admiral Charles H. Davis, Superintendent of the Naval Observatory, in relation to the various proposed lines for interoceanic canals and railroads between the waters of the Atlantic and Pacific oceans. (39th Cong., 1st sess., Senate Ex. Doc., Vol. II, No. 62.)

[*Washington, 1866.*]

13 pl., 28 p. 22½ cm.

Caption title.

*Report on interoceanic canals and railroads between the Atlantic and Pacific oceans. By Rear-Admiral Charles H. Davis, Superintendent of the Naval Observatory.

Washington, Government Printing Office, 1867.

14 pl., 37 p. 22½ cm.

Also issued in same letterpress without plates.

*Report on interoceanic canals and railroads between the Atlantic and Pacific oceans. By Rear-Admiral Charles H. Davis, Superintendent of the Naval Observatory. Reprinted from the second edition ordered by the United States Senate.

No place, no date.

136 p. 23½ cm.

In larger type than the other editions.

Explanation of the seal of the U. S. Naval Observatory [By Rear-Admiral C. H. Davis.]

[*Washington, 1867.*]

1 pl., cover-title+3 p. 28 cm.

Also in Washington Observations, 1865, p. [XXXVIII]–XLI.

*Observations and discussions on the November meteors of 1867. U. S. Naval Observatory, Washington. [Reported by Professor J. R. Eastman.]

Washington, Government Printing Office, 1867.

3 pl., 40 p. 23 cm.

*November meteors of 1868, U. S. Naval Observatory, Washington.

[*Washington, 1868.*]

1 pl., cover-title+10 p. 23 cm.

Discussion of the West India cyclone of October 29 and 30, 1867. Prepared by order of Commodore B. F. Sands, U. S. Navy, Superintendent U. S. N. Observatory, by J. R. Eastman, prof. of mathematics, U. S. Navy.

Washington, Government Printing Office, 1868.

1 pl., 17 p. 23 cm.

Catalogue of the Library. [Compiled by Professor J. E. Nourse.]

[*Washington*] *U. S. Naval Observatory, 1868.*

23 p.+1 f. 30 cm.

*Instructions for the observation of the total eclipse of August 7, 1869, by observers without telescopes near the limits of totality.

[*Washington, 1869.*]

2 f. 33 cm.

Caption title.

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*The opposition of Mars in 1877. [By Professor J. R. Eastman.]
[*Washington, 1876.*]
5 p. 23 cm.

*Narrative of the North Polar Expedition. U. S. ship *Polaris*, Captain Charles Francis Hall, commanding. Edited under the direction of the Hon. G. M. Robeson, Secretary of the Navy, by Rear-Admiral C. H. Davis, U. S. N.. U. S. Naval Observatory, 1876.
Washington, Government Printing Office, 1876.
40 pl., 1 f.+696 p. 26½ cm.

*Reports of foreign societies on awarding medals to the American Arctic explorers, Kane, Hayes, Hall. [Compiled by Professor J. E. Nourse.]
[*Washington*] *U. S. Naval Observatory, 1876.*
Front., 70 p. 23 cm.
Prepared for the Centennial Exposition.

*Chronometers at the United States Naval Observatory. [Lieut.-Commander C. H. Davis, jr., in charge of instruments.]
[*Washington*] *1876.*
[3] p. 28 cm.

*Letter to the Hon. R. W. Thompson, Secretary of the Navy, announcing the discovery of satellites of Mars. [Signed by John Rodgers, rear-admiral and superintendent.]
U. S. Naval Observatory, Washington, August 21, 1877.
3 p. 25½ cm.

*Reports on the removal of the United States Naval Observatory. Rear-Admiral John Rodgers, superintendent. 1877.
Washington, Government Printing Office, 1877.
20 p. 23 cm.
From Report of the Secretary of the Navy, 1877, p. 307–324; 45th Cong., 2d sess.. House Ex. Doc., Vol. VII. No. 1, Pt. 3.

*Report on the usefulness of government observatories. By Rear-Admiral John Rodgers, Superintendent of Naval Observatory, Washington, D. C. 1877.
Washington, Government Printing Office, 1877 [*1878*].
6 p. 23 cm.
45th Cong., 2d sess., Senate Ex. Doc. No. 28.

*Instructions for observing the transit of Mercury, 1878, May 5 6. U. S. Naval Observatory. [By Prof. Simon Newcomb.]
Washington, Government Printing Office, 1878.
1 pl., 8 p. 30 cm.
Reprinted in Washington Observations for 1876, Appendix II. p. 43–48.

*Total solar eclipse of 1878, July 29. Notice to intending observers. [By Rear-Admiral John Rodgers, U. S. Navy, superintendent.]
Washington, February, 1878.
2 f., versos blank. 25½ cm.

*Instructions for observing the total solar eclipse of July 29, 1878. [By Prof. William Harkness.] Issued by the U. S. Naval Observatory.
Washington, Government Printing Office, 1878.
3 pl., 30 p. 30 cm.
Reprinted in Washington Observations for 1876, Appendix III. p. 1–26.

*Catalogue of stars observed at the United States Naval Observatory during the years 1845 to 1877, and prepared for publication by Professor M. Yarnall, U. S. N., by order of Rear-Admiral John Rodgers, U. S. N., superintendent. 2d edition, revised and stereotyped.
Washington, Government Printing Office, 1878.
21+281 p. 29½ cm.

*[Circular letter to "Counteract the circular invoking the interference of the National Academy of Sciences in regard to the proposed measure of moving the Naval Observatory." By Rear-Admiral John Rodgers, U. S. N., superintendent.]
Washington, January 30, 1878.
[3] p. 20½ cm.

*[Letter to the members of the National Academy of Sciences to "Counteract the circular invoking the interference of the . . . Academy . . . in regard to the proposed measure of moving the Naval Observatory." Signed by M. Yarnall, A. Hall, Wm. Harkness, J. E. Nourse, J. R. Eastman, E. S. Holden.]
Washington, D. C., January 24, 1878.
[1] p. 25½ cm.

*Observations and orbits of the satellites of Mars, with data for ephemerides in 1879. By Asaph Hall, professor of mathematics, U. S. Navy. Rear-Admiral John Rodgers, U. S. Navy, Superintendent of the Naval Observatory.
Washington, Government Printing Office, 1878.
46 p. 29½ cm.
A few copies of this paper were bound with the Washington Observations for 1875. The others were issued separately.

*[Circular letter inviting "Criticism and advice upon a plan for the new Naval Observatory." Signed by John Rodgers, rear-admiral, superintendent.]
U. S. Naval Observatory, Washington, D. C., February 7, 1878.
2 p.+1 blank f. 20½ cm.

*Report of the Commission on site for Naval Observatory. [By Daniel Ammen, rear-admiral, U. S. N.; J. G. Barnard, colonel and brevet major-general; Leonard Whitney.]
Washington, Government Printing Office, 1879.
3 pl., 18 p. 23 cm.
Also in Report of the Secretary of the Navy, 1878, p. 292–307; 45th Cong., 3d sess., House Ex. Doc. Vol. VIII, No. 1, Pt. 3

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*Narrative of the Second Arctic Expedition made by Charles F. Hall: his voyage to Repulse Bay, sledge journeys to the straits of Fury and Hecla and to King William's Land, and residence among the Eskimos during the years 1864–'69. Edited under the orders of the Hon. Secretary of the Navy, by Prof. J. E. Nourse, U. S. N., U. S. Naval Observatory, 1879.

Washington, Government Printing Office, 1879.

27 pl.+1 mp. in pocket, 6 f.+50+644 p. 27 cm.

Catalogue of the Library of the United States Naval Observatory, Washington. Part I.—Astronomical bibliography, by Prof. Edward S. Holden, U. S. N.

Washington, Government Printing Office, 1879.

10 p. 30 cm.

*Reports on the total solar eclipse of 1878, July 29. By Professor Simon Newcomb, U. S. Navy, Commander W. T. Sampson, U. S. Navy, Lieutenant Chas. G. Bowman, U. S. Navy. Extracted from Appendix III to the Washington Observations for 1876.

Washington, Government Printing Office, 1880.

2 pl., 1 f.+99–116 p. 29 cm.

Only a few separates printed.

*Report on the total solar eclipse of 1878, July 29. By Ormond Stone. Extracted from Appendix III to the Washington Observations for 1876.

Washington, Government Printing Office, 1880.

1 pl., 1 f.+235–248 p. 29 cm.

Only a few separates printed.

*Report on the total solar eclipse of 1878, July 29. By D. P. Todd, assistant in the Office of the American Ephemeris and Nautical Almanac. Extracted from Appendix III to the Washington Observations for 1876.

Washington, Government Printing Office, 1880.

12 pl., 2 f.+329–366 p. 29 cm.

Only a few separate copies printed, mainly for distribution to the members of Professor Todd's party.

*Circular [stating classes of scientific publications desired for the library, and how they should be addressed. Signed by John Rodgers, rear-admiral, U. S. Navy, superintendent.]

U. S. Naval Observatory, Washington, September 20, 1880.

[1] p. 25½ cm.

*. . . In memoriam . . . At a meeting of the gentlemen attached to the United States Naval Observatory, Washington D. C., held May 10th 1882, in commemoration of the late Rear-Admiral John Rodgers, U. S. N., Superintendent of the U. S. Naval Observatory since May 1st 1877, it was resolved . . .

Engraved sheet in borders 39 x 24½ cm.

Designed by E. R. Knorr and drawn by Max Franke. At top is an arctic sketch, with the subscription: U. S. ship *Vincennes*, Comdr. J. Rodgers, at Herald Isld., Arctic Ocean, August 15th, 1855. Beneath this are three scrolls: the central or largest bearing the words,—In Memoriam; the top scroll bears the date, August 8th 1812; while May 5th 1882 is on the lowest one. Under the name Naval Observatory is a battle scene with the following subscription: Capture of the Confederate ironclad *Atlanta* by the U. S. monitor *Weehauken*, Capt. J. Rodgers, in Warsaw Sound, June 17th 1863. Near the center of the plate is a view of the Observatory. The resolutions are followed by the facsimile signatures of W. T. Sampson . . . Asaph Hall . . . Wm. Harkness . . . J. R. Eastman . . . E. Longnecker . . . E. K. Moore . . . Edgar Frisby . . . Edward F. Qualtrough . . . S. J. Brown . . . Joseph A. Rogers . . . Tho's Harrison . . . Aaron N. Skinner . . . Miles Rock . . . William C. Winlock . . . A. S. Flint . . . Emil Weissner . . . Wm. M. Brown, Jr. . . . Wm. F. Gardner . . . These resolutions were also issued under the caption title:

*Resolutions upon the death of Rear-Admiral John Rodgers, adopted at the Naval Observatory.

1 p. of letter-press, in borders 27 x 19 cm.

*Programme of work to be pursued at the U. S. Naval Observatory at Washington, D. C., during the year beginning January 1, 1885. Transmitted by Commodore S. R. Franklin, U. S. Navy, superintendent.

[*Washington, 1885.*]

[1] p. 35½ cm.

*Observations of minor planets with the 9.6-inch equatorial made at the U. S. Naval Observatory, Washington, by Professor E. Frisby [January 7 to February 16, 1885]. Communicated by Rear-Admiral S. R. Franklin, U. S. Navy, superintendent.

[*Washington, 1885.*]

[1] p. 31 cm.

*Observations of the first contact of the partial solar eclipse of March 15–16, 1885, made at the United States Naval Observatory, Washington. Communicated by Rear-Admiral S. R. Franklin, U. S. Navy, superintendent.

[*Washington, 1885.*]

[1] p. 25½ cm.

*Programme of work to be pursued at the U. S. Naval Observatory in Washington, D. C., during the year beginning January 1, 1886. Commodore George E. Belknap, U. S. N., superintendent.

[*Washington, 1886.*]

[1] p. 36 cm.

*. . . List of observatories upon the exchange list of the U. S. Naval Observatory, Washington, January 1, 1886.

[*Washington, 1886.*]

3 p. 20½ cm.

Caption title.

*Circular [in which the Superintendent "Requests an expression of opinion as to whether, in view of the Signal Service Office in Washington . . . it is or is not desirable to continue the publication of the Results of Meteorological Observations made at the Naval Observatory."]

Washington, August 1, 1886.

[1] p. 26½ cm.

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*Programme of work to be pursued at the Naval Observatory, Washington, during the year 1887. Captain R. L. Phythian, U. S. N., superintendent.
[*Washington, 1887.*]

[1] *p.* 35½ *cm.*

Proposed observations at the opposition of Mars in 1892. [Circular letter prepared by Prof. J. R. Eastman.]
[*Washington*] *United States Naval Observatory* [*1892*].

Cover-title+4 *p.* 20 *cm.*

*Initiatory regulations of the U. S. Naval Observatory, August 1, 1892.
[*Washington, 1892.*]

Cover-title+12 *p.* 20 *cm.*

*Regulations of the U. S. Naval Observatory April 21, 1894.
[*Washington, 1894.*]

14 *p.* 23 *cm.*

*Regulations for the government of the U. S. Naval Observatory. [September 20, 1894.]
[*Washington, 1894.*]

14 *p.* 24 *cm.*

*Instructions for observing the transit of Mercury, November 10, 1894. Issued by the United States Naval Observatory. [By Professor Wm. Harkness.]
[*Washington, 1894.*]

4 *p.* 29½ *cm.*

Instructions for the care of chronometers in store, on shipboard and during transportation. Navy Department, Bureau of Equipment, 28 April, 1896.
Washington, Government Printing Office, 1896.

7 *p.* 19½ *cm.*
For distribution to ships of the Navy only.

[Circular letter informing foreign astronomers intending to come to the United States to observe the total eclipse of the Sun, 1900; that arrangements had been made with the Treasury Department for the admission of their instruments free of duty; and tendering the assistance of the Observatory upon their arrival and when locating. Signed by] C. H. Davis, Captain, U. S. N., superintendent.
Washington, D. C., May 17, 1899.

[1] *p.* 27 *cm.*

Total eclipse of the Sun, May 28, 1900. Prepared by direction of C. H. Davis, capt., U. S. Navy, Superintendent U. S. Naval Observatory, by H. D. Todd, professor, U. S. N., Director Nautical Almanac, S. J. Brown, professor, U. S. N., astronomical director. (Supplement to the American Ephemeris, 1900.) Published by authority of the Secretary of the Navy.
Washington, Bureau of Equipment, 1900.

5 *pl.*, 32 *p.* 25½ *cm.*
Instructions for observers, published jointly with the Nautical Almanac Office.

Telegraphic time signals sent out at noon daily, except Sundays and holidays, by the U. S. Naval Observatory. [By Lieut.-Commander E. E. Hayden.]
[*Washington, 1902.*]

[1] *p.* 21½ x 25½ *cm.*
Caption title.
From Report of the Superintendent, 1902, facing page 32, also forms second leaf of the Notice of a special series of midnight telegraphic time signals to be sent out on May 3, 1905.

Ship's chronometer records (U. S. Naval Observatory) - Instructions for the care of chronometers and watches, with blank forms for records.— Instructions: Chronometers, torpedo-boat watches, chronometer watches, stop watches, and comparing watches.—Blank forms: Form No. 1, Data for issue. Form No. 2, Rate curve and observations on board ship. Form No. 3, Observed errors and mean daily rates and temperatures. Form No. 4, Daily comparisons and memoranda . . [By Lieut.-Commander E. E. Hayden.]
Washington, Government Printing Office, 1903

1 folded sheet in pocket+1 *f.*+9 *p.*+52 *f.* 35½ *cm*
Forms 1, 2, and 3, are not bound in the volume, but are printed on a separate sheet in the pocket of the volume.
For distribution to ships of the Navy only.

Instructions for the care of chronometers and watches
[*Washington, 1903.*]

[5] *p.* 33½ *cm.*
Caption title.
Reprinted from Ship's chronometers records, p. 5-9
For distribution to ships of the Navy only.

. . . Instructions for the care of torpedo-boat and other watches . . . reprinted from the book of Ship's chronometer records . . .
[*Washington, 1903.*]

[1] *p.* 33½ *cm.*
Caption title.
For distribution to ships of the Navy only.

*Regulations for the government of the U. S. Naval Observatory. [January 25, 1904.]
[*Washington, 1904.*]

16 *p.* 24 *cm.*

*Notice of a special series of midnight telegraphic time signals to be sent out by the U. S. Naval Observatory on May 3, 1905. [Signed by Rear-Admiral C. M. Chester, U. S. N., superintendent.]
(*Washington, D. C., March 31, 1905.*)

2 *f., versos blank.* 27 *cm.*
Caption title.

* . . . Circular. The total solar eclipse of August 29–30, 1905. [Signed by Rear-Admiral C. M. Chester, U. S. N., superintendent.]
Washington, April 12, 1905.

3 *p.* 27 *cm.*

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U. S. NAVAL ASTRONOMICAL EXPEDITION TO THE SOUTHERN HEMISPHERE.

*The U. S. Naval Astronomical Expedition to the Southern Hemisphere, during the years 1849–'50–'51–'52. Lieut. J. M. Gilliss, superintendent; Lieut. Archibald MacRae, Acting Master S. L. Phelps, Captain's Clerk E. R. Smith, assistants. Volume I.—Chile; its geography, climate, earthquakes, government, social condition, mineral and agricultural resources, commerce, &c., &c. By Lieut. J. M. Gilliss, A. M. . . . (33d Congress, 1st session, House of Representatives, Ex. Doc. No. 121.)

Washington, A. O. P. Nicholson, printer, 1855.

14 pl., 13 p.+1 f.+556 p. 30 cm.

*The U. S. Naval Astronomical Expedition to the Southern Hemisphere, during the years 1849–'50–'51–'52. Lieut. J. M. Gilliss, superintendent; Lieut. Archibald MacRae, Acting Master S. L. Phelps, Captain's Clerk E. R. Smith, assistants. Volume II.—The Andes and Pampas, by Lieut. Archibald MacRae; Minerals, J. Lawrence Smith; Indian remains, Thomas Ewbank; Mammals, Spencer F. Baird; Birds, John Cassin; Reptiles, fishes, and crustacea, Charles Girard; Shells, A. A. Gould; Dried plants, Asa Gray; Living plants and seeds, William D. Brackenridge; Fossil mammals, Jeffries Wyman. Fossil shells, T. A. Conrad. (33d Congress, 1st session, House of Representatives, Ex. Doc. No. 121.)

Washington, A. O. P. Nicholson, printer, 1855.

37 pl., 9 p.+1 f.+300 p. 30 cm.

11 woodcuts in text.

*The U. S. Naval Astronomical Expedition to the Southern Hemisphere, during the years 1849–'50–'51–'52. Lieut. Archibald MacRae, Master S. Ledyard Phelps, Captain's Clerk E. R. Smith, assistants. Volume III.—Observations to determine the solar parallax. By Lieut. J. M. Gilliss, LL. D., superintendent. (33d Congress, 1st session, House of Representatives, Ex. Doc. No. 121.)

Washington, A. O. P. Nicholson, printer, 1856.

1 pl., 4 p.+2 f. last blank+288+492 p. 30 cm.

*The U. S. Naval Astronomical Expedition to the Southern Hemisphere, during the years 1849–'50–'51–'52. Lieut. Archibald MacRae, Master S. Ledyard Phelps, Captain's Clerk E. R. Smith, assistants. Volume VI.—Magnetical and meteorological observations under the direction of Lieut. J. M. Gilliss, LL. D., superintendent. (33d Congress, 1st session, House of Representatives, Ex. Doc. No. 121.)

Washington, A. O. P. Nicholson, printer, 1856.

48+420 p. 30 cm.

Vols. IV and V were never published; for the results of the observations that were to have been contained in them, see Washington Observations for 1868, Appendix I, and 1890, Appendix I, respectively.

*Origin and operations of the U. S. Naval Astronomical Expedition. (From Vol. III, U. S. N. Astronomical Expedition, published by order of Congress U. S.)

[Washington, A. O. P. Nicholson, printer, 1856?]

42 p. 30 cm.

Signed by J. M. Gilliss, Washington, 1854.

PUBLICATIONS OF THE TRANSIT OF VENUS COMMISSION.

*Papers relating to the transit of Venus in 1874, prepared under the direction of the Commission authorized by Congress and published by authority of the Hon. Secretary of the Navy. Part I.

Washington, Government Printing Office, 1872.

25 p. 29½ cm.

Contains letter of Rear-Admiral Sands suggesting Congressional appropriation, and also four papers on the application of photography to the observation of the transit.

Papers relating to the transit of Venus in 1874, prepared under the direction of the Commission authorized by Congress and published by authority of the Hon. Secretary of the Navy. Part II.

Washington, Government Printing Office, 1872.

48 p. 29½ cm.

Contains tables for facilitating predictions of the several phases of the transit, by Mr. George W. Hill.

Atlas to Part II of the Papers relating to the transit of Venus in 1874, prepared under the direction of the Commission authorized by Congress and published by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1873.

4 charts, [1] p. 40 x 43 cm.

Instructions for observing the transit of Venus, December 8–9, 1874, prepared by the Commission authorized by Congress and printed for the use of the observing parties by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1874.

28 p. 29½ cm.

Investigation of corrections to Hansen's *Tables of the Moon;* with tables for their application. By Simon Newcomb, professor, U. S. Navy. Forming Part III of Papers published by the Commission on the transit of Venus.

Washington, Government Printing Office, 1876.

51 p. 29½ cm.

Observations of the transit of Venus, December 8–9, 1874, made and reduced under the direction of the Commission created by Congress. Edited by Simon Newcomb, professor U. S. Navy, secretary of the Commission. Published by authority of the Honorable Secretary of the Navy.

Washington, Government Printing Office, 1880.

2 pl., 1–8+7–157 p. 30 cm.

46th Cong., 1st sess., Senate Ex. Docs., Vol. II, No. 31. Half-title reads: Part I.—General discussion of results. By Simon Newcomb, secretary of the Commission.

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*[Circular letter from Rear-Admiral John Rodgers, Pres't of Transit of Venus Commission to the members of a committee appointed to consider the subject, with a] Memorandum respecting proposed observations on the transit of Venus occurring December 6, 1882.

U. S. Naval Observatory, Washington, November 29 1881.

2°+6 f. versos blank. 34½ cm.

Hectographed.

Instructions for observing the transit of Venus, December 6, 1882, prepared by the Commission authorized by Congress, and printed for the use of the observing parties, by authority of the Hon. Secretary of the Navy.

Washington, Government Printing Office, 1882.

4 pl., 50 p. 29½ cm.

*Instructions respecting time-signals to be used in connection with the transit of Venus, December 6, 1882. Issued by the United States Transit of Venus Commission.

[Date at end] Washington, November 28, 1882.

4 p. 29½ cm.

Caption title.

List of articles furnished to the United States transit of Venus parties in December, 1882.

[Washington, 1882.]

18 p. 27 cm.

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